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ENVIRONMENTAL STUDIES

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June 26, 2000

Ms. Linda Dietz, Remedial Project Manager
U.S. Environmental Protection Agency
Region III
1650 Arch Street
Philadelphia, Pennsylvania 19103-2029

RE: Comments, Draft Focused Feasibility Report
Metal Bank of America Superfund Site

By Hand Delivery

Dear Ms. Dietz:

Attached are our comments on the Draft Focused Feasibility Report prepared by CDM and issued 17 May 2000.

While our comments are necessarily critical of a number of aspects of CDM's work, I believe that these arise from the fact that CDM was limited in time and consequently what they could review while our experience with the Site has been accumulated over 20 years. In fact, I am pleased to note that CDM did give the Site Owner's Plan a better score than the ROD Plan.

Our evaluation of the FFS shows with certainty that EPA's ROD Plan and the PRP Group's Plan will release more PCBs to the environment than the Site Owner's Plan. These remedial actions and consequent PCB emissions and other effects will impact St. Vincent's School. Engineering controls may lower some impacts but cannot eliminate any of them.

PCB emission calculations for all remediation exposure pathways have not been made due to time constraints. Those that have been are initial draft assessments. However, the qualitative and quantitative nature of the risks in implementing a plan calling for the movement of 10,000 to 20,000 cubic yards of PCB-contaminated material is evident.

I appreciate your time and consideration and am looking forward to attending a meeting where we can discuss these comments and the various plans. I think that CDM's report would have engendered less comment on our part if we could have met before it was released. Please also call if you have any questions or need additional information.

Please note that nothing in this submission is intended to nor should it be construed to give up any legal rights and positions of Metal Bank and the other members of the Owner Group in the underlying litigation.[1] Our comments are not a joint effort with the PRPs.

Sincerely,

Edward W. Kleppinger, Ph.D.

Attachments: Reservation of Rights, Comments Draft Focused Feasibility Study Report

cc: With Attachments.
J. Mattioni, Esq., Mattioni, Ltd.
P. McQuiston, Ogden

A:\Cover Letter.wpd October 28, 1999
June 25, 2000

[1] See the attached statement which is also included as Attachment 2, Legal Qualifications and Reservation of Rights, of the attached comments.

LEGAL QUALIFICATIONS AND RESERVATION OF RIGHTS

This Statement is attached to and made an integral part of the Comments, Draft Focused Feasibility Study, dated June 26, 2000, prepared by EWK Consultants, Inc. (the "Comments"). The Comments are being submitted to the U.S. Environmental Protection Agency on behalf of U.C.O.-M.B.A. Corporation and the other Defendants (the "Owner Group") in the case of *United States v. The Union Corporation, et al.*, relating to the Metal Bank Cottman Avenue Superfund Site (the "Site"), pending in the U.S. District Court for the Eastern District of Pennsylvania (the "Litigation"), with the purpose, in substantial part, of resolving the Litigation. Neither submission of the Comments to EPA nor any part of its contents are intended to be or are to be deemed as an admission of liability or as a waiver or abandonment of any of the Owner Group's legal rights, positions, claims or defenses otherwise available to them. In that regard it remains the Owner Group's position that its members have been legally relieved of all further liability for response actions or costs at the Site, and that the EPA's Record of Decision for the Site (the "ROD") is seriously flawed and that very limited or no additional remediation is legally or technically necessary or appropriate to achieve the degree of protection of public health, safety or the environment appropriate to the Site. The Comments address proposed implementation of and changes to EPA's chosen remedial alternative adopted in the ROD that will more appropriately and cost-effectively meet the remedial objectives of the ROD. The failure, within the context of these Comments, to object to or challenge any of the deficiencies of the ROD including, but not limited to, the administrative process, the remedial goals and objectives and the selected remedial alternative or any part thereof, is not intended to nor shall it be deemed as acceptance of the ROD or any part thereof. This Plan, prepared on the advise, at the request and under the direction of counsel, and its preparation are Attorney Work Product subject to full protection under the law, the Federal Rules of Evidence, and the Federal Rules of Civil Procedure from disclosure.

COMMENTS

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Comments

Draft Focused Feasibility Study Report

Metal Bank of America Superfund Site

June 26, 2000

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Table of Contents

List of Figures and Tables

EXECUTIVE SUMMARY

The Focused Feasibility Study ("FFS") [8.1][1] prepared for EPA by CDM Federal Programs ("CDM"), contains a number of errors and unsupported opinions and conclusions material to the selection of the appropriate remedy for the Southern Area soils. These comments analyze the major, most critical problem with the FFS.[2] In its review of the three proposed remedial alternatives for the Metal Bank Superfund Site ("Site"), the FFS fails to focus on the single, significant, environmental and public health difference between the plans and to analyze this difference in a scientific, quantitative and environmentally significant way. Instead, unsupported "facts", statements and opinions are given in the FFS. Despite these shortcomings, the FFS properly does conclude that on the basis of EPA's evaluation criteria, the Site Owner's Plan [8.2] is better than the Record of Decision ("ROD") Plan [8.3] as envisioned by EPA.

There is only one meaningful difference between the plans:

Dig up PCB contamination and haul it off-site for disposal leaving residual PCBs at the site ("dig and haul"), versus

Secure the PCB contamination in place and treat to eliminate any possible release ("secure and treat").

There is only one significant question to be asked in assessing the dig and haul and the secure and treat approaches:

Which proposal produces the least short-term and long-term PCB emissions to the environment?

There is only one way to obtain the answer to this question:

Scientific knowledge and calculations can be used to estimate PCB releases to the environment for both options. These release estimates can be compared to arrive at an answer.

There is a scientifically valid answer to the question:

Securing the PCBs on-site and treating results in the lowest overall long-term and

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[1] This citation format refers to those as listed in Section 8 of these comments. For example, this indicates reference Citation 1.

[2] The Metal Bank Site Owner's proposed remedial plan was submitted to EPA on 14 January 2000. [8.2] The plan was submitted under a reservation of rights, attached as Appendix 5.1, noting that the plan was submitted "with the purpose, in substantial part, of resolving the Litigation." These comments on the FFS are submitted with the same purposes and under the same legal qualifications and reservation of rights. The Metal Bank Site Owner's proposed remedial plan, including Appendix 5.1, is made part of these comments on the FFS.

short-term emissions of PCBs to the environment while meeting all ROD requirements.

There are other benefits to the secure and treat option versus the dig and haul option:

It costs less.
It meets the Congressional preference for on-site remedies.
It is a much safer approach overall.
It does not impact St. Vincent's School.

1.0 Introduction.

EPA Region III has attempted to analyze three remedial plans for the remediation of the Metal Bank of America Superfund Site ("Site") by retaining a contractor to conduct a focused feasibility study ("FFS").[3] [8.1] The three plans: (1) by the EPA [8.3], (2) the Utility PRP Group [8.4] and (3) the Site Owner [8.2], are similar but for one major difference. The EPA's and the PRP Group's plans propose to dig up soils and materials showing a greater than 25 ppm PCB concentration and haul them off-site for disposal. These plans do not provide for any treatment of residual PCBs which will be left on site after digging and hauling. The Site Owner plan proposes that it is environmentally sounder to contain the contamination on-site and provide treatment against any possible releases. Table 1.1 summarizes the similarities and differences in the plans.

Table 1.1 A Comparison of Proposed Remedial Plans.

Media	EPA ROD	Utility PRP Group	Site Owner
On-site PCB contaminated materials.	Excavation and removal of PCBs above 25 ppm.	Excavation and removal of PCBs above 25 ppm.	No disturbance of any PCBs.

[3] CDM prepared the FFS under severe time constraints imposed by EPA. This possibly accounts for a number of errors in the FFS which probably would not be there had more time for a thorough review been available. For example, CDM states that "of greatest impact was a release from the [underground storage tank] UST." It is no longer disputed that the UST was and is sound and was not the source of any release of PCBs. CDM was also limited to reviewing the documents that it was given by its client and was not necessarily provided with access to all relevant materials and information necessary for a full evaluation.

Media	EPA ROD	Utility PRP Group	Site Owner
LNAPL.[4,5]	LNAPL collection system.	Excavation of residual LNAPL. No perimeter LNAPL collection system.	Perimeter LNAPL collection system utilizing impervious composite sheet pile/HDPE wall.

[4] LNAPL stands for Light Non-Aqueous Phase Liquid. In its Proposed Plan of July 1995 [8.5, Page 2] EPA defines LNAPL as "...a condition where an oil layer, being immiscible with and lighter than water, floats on top of the water table." A necessary condition that follows from this definition is that the floating oil will flow on top of the water table. Thus, if there is an extraction point for water, i.e. a low point in the water table, LNAPL, if it exists, must float toward that point.

[5] EPA's position is that since it has decided that LNAPL exists at the Site, the issue is closed regardless of new additional evidence to the contrary. [8.6] We have never agreed that LNAPL is still present at the Site as that term is scientifically understood and have repeatedly shown why in our formal and informal comments to EPA. There will soon be an additional study of the issue by the Site Owner. However, for purposes of these comments and settlement, the Site Owner's Plan assumes that LNAPL is present and adopts the EPA's "remedial" methodology.

Media	EPA ROD	Utility PRP Group	Site Owner
Groundwater treatment to remove residual PCBs.[6,7]	No groundwater treatment.	No groundwater treatment.	Groundwater treatment using earbon canisters.

[6] All three remedial options contemplate that the groundwater is and will remain contaminated by PCBs and other on-site and off-site source contaminants to some degree after remediation. Only the Site Owner's Plan provided for its long-term treatment before discharge to the Delaware River. As proven in these comments, this is much more effective at eliminating PCB releases than the plan proposing excavation and removal off-site of the >25 ppm materials but without treating the groundwater. CDM is misleading when it states that the Site Owner's Plan "is the least protective of the groundwater." [8.1 at p. 5-2] In fact, it is the most protective of the three plans in that it treats the groundwater for removal of most mobile organic and heavy metal contaminants. Furthermore:

a.) It has been scientifically proven that the removal of >25 ppm PCB contaminated materials does not significantly lower the post-remediation, effective groundwater PCB concentrations at the site. [8.7; 8.8]

b.) Maximum possible solubility levels of PCBs in groundwater are related to the Aroclor® type. This is generally inversely related to the degree of biphenyl molecule chlorination as well as to some extent the locations of the chlorine atoms on the molecule. So long as there is an excess of amounts required to reach saturation values, the total amount of source PCBs present is irrelevant. EPA has never considered this scientific fact in its determination to remove PCBs from the site.

c.) Four technical studies of the most highly PCB-contaminated materials from test pits at the Site showed that water did not leach PCBs from these materials at detectable levels. [8.9]

[7] The proposed treatment will also remove other contaminants in the groundwater such as polynuclear aromatic hydrocarbons ("PAHs") and heavy metals.

Media	EPA ROD	Utility PRP Group	Site Owner
Sediments, >1<25 removed.[8]	Move on-site using low impact removal.[9]	Move on-site using low impact removal.	Move on-site using low impact removal.[10]

[8] It has long been known that removing Delaware River sediments will necessarily not be surgically precise and that in consequence PCBs will be released into the waters of the Delaware River, the effects of the "cure" being assumed to be less than those of the "disease." (See a discussion of this in Section 2.1 of these Comments.) Since EPA published its ROD, there have been three significant developments which continue to support the position that sediments at the Site should not be removed.

a. The key assumption used in risk assessment of sediment is not valid. The risk assessment that EPA uses [8.10] to define a sediment removal requirement in its ROD is based in large measure on "protecting" an endangered species, the Shortnosed Sturgeon ("SNS"). A report has been published by the National Oceanic and Atmospheric Administration ("NOAA") relating to the protection of the SNS which indicates that the species would not visit the river next to the Site and in any event is not sensitive to PCBs in sediments. [8.11]. The Site Owner has previously submitted the report and comments for inclusion in the Administrative Record for the Site [8.12].

b. Discharges of PCBs from the Site have ceased. A comparison of the PCBs in sediment values between the Remedial Investigation ("RI") samples [8.13] and those obtained during the Preliminary Design Investigation ("PDI") [8.14] clearly shows a significant decrease with time, thus demonstrating that the remediation conducted in the 1980s stopped on-going PCB discharges from the Site.

c. The source of PCBs in the Delaware River is sewer discharges. A study by the Delaware River Basin Commission ("DRBC") published in June 1998 clearly demonstrates that the main source of PCBs into the Delaware River is from on-going storm and sanitary sewers and treatment plant discharges. [8.15]

[9] The EPA ROD [8.3] calls for sediment removal after construction of a coffer dam and dewatering. The parties generally agree that this is not technically and economically feasible in the Delaware River. If sediments have to be removed, low impact dredging and the use of silt curtains is the methodology offering the lowest environmental impact. There will be sediments and PCBs released into the Delaware River and total habitat destruction as a necessary part of such removal operations. The only way to achieve 100% control, zero releases of PCBs and preserve the habitat is to not dredge in the first place.

2.0 Release Mechanisms for PCBs During and Post Remediation.

2.1 Introduction.

The Second Law of Thermodynamics, which is empirically derived, states that in any process entropy, a measure of disorder, is increased. From an environmental prospective, remediation of a site will always cause negative environmental impacts as the negative price the environment pays for the remediation. This translates into "There is no such thing as a free lunch."

There are both primary and secondary negative environmental impacts for each remedial action. An example is the issue of PCBs in the sediments of the Delaware. The EPA ROD calls for the removal of PCBs in sediments at concentrations greater than 1 ppm.[11] No matter what technological choice for removal is selected, its use will release some amounts of PCB-containing sediments into the environment. The use of the technology will also entail secondary environmental releases of other kinds such as nitrogen oxides, volatile organic hydrocarbons, and carbon monoxide into the atmosphere from the engines driving the dredge, or the pile driver, or the front end loader. The primary and secondary negative environmental impacts are incurred at the time and location of the remedial activities.

In recent years environmental costs beyond those directly incurred by a particular activity have come to be recognized and of concern. These have been addressed under the rubric of "life cycle costs". Using the sediment removal example, these secondary environmental costs are seen in costs to the environment from the delivery of fuel to the engines, the refining of that fuel, the producing and transporting the crude oil that was converted into the fuel, and additionally down the chain of actions caused by the use of the particular engine in the remediation. Other life cycle secondary negative environmental impacts would include those from making the steel,

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[10] The Site Owner has consistently taken the position that sediment removal from the mud flats and Delaware River is neither necessary nor environmentally sound. However, for purposes of these comments and settlement, the Site Owner's Plan adopts the EPA's and the Utility PRP Group's "dig and haul remedial" methodology for this area.

[11] As noted earlier, we do not agree that this is a necessary, environmentally sound action but have adopted it in our remedial plan solely in an attempt to obtain settlement of the litigation between the Site Owner and the EPA. Given existing and new information showing only small and ever decreasing levels of PCBs in the sediments and absence of material risk, see footnote 8 above, EPA should reconsider its position on sediment removal at this Site.

making the engine, and up the chain.

Our analysis in these comments of environmental releases due to proposed remediation at the Site has not considered any secondary environmental impacts. We have also not attempted to calculate the absolute value of all primary costs to the environment, or the absolute value of PCBs released to the environment. We have calculated the relative, directly related, PCB environmental costs as posed by the two basic remedial plans of dig and haul, and secure and treat. This relative analysis assumes that if two differing plans adopt, for whatever reason, the same remedial technology, the relative environmental costs posed by releasing PCBs into the environment are zero, and cancel each other out.

To summarize, some of the relative increases in unintended PCB emissions to the environment as between the EPA's ROD Plan and the Site Owner's Plan are calculated in Section 3 of these comments. The FFS suggests that these emissions do not need to be considered because they will be subject to controls. No control is 100% effective. In order to adequately compare differing remedial options, an estimate of irreducible emissions to the environment is necessary.

2.2 Remedial Components Exhibiting Different PCB Environmental Releases.

The Site Owner's Plan, structured in the interest of settlement, accepts all but one EPA ROD determination: that is, that PCBs greater than 25 ppm be dug up and disposed of off-site.[12]

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[12] EPA, at various times and in various documents, seems to have developed three reasons for the removal of greater than 25 ppm PCB materials from the Site:

a.) EPA policy does not favor containment in a flood plain.

b.) Greater than 25 ppm PCB-containing materials can leach into groundwater and be released from the Site into the Delaware River in environmentally significant quantities.

c.) EPA PCB clean-up policy requires it.

In each case there are simple responses which demonstrate the inaccuracy of this reasoning.

a.) The Site is not in a flood plain. As discussed in these comments the Site is already some

We have, however, structured a plan that meets the remedial goals of even this EPA ROD determination. This goal is accomplished by containment and treatment of the groundwater before discharge, the only possible release mechanism.

When reduced to a relative analysis of the PCBs released to the environment, the remedial options: the dig and haul versus the secure and treat, differ in only two significant regards:

a.) The Site Owner's Plan does not require digging and hauling. No PCBs will be disturbed and there will be no related emissions to the environment. Section 3 of these comments describes the dig and haul PCB emissions and quantifies some of them.

b.) Under post-remedial conditions and under both plans, residual PCBs will remain at the Site, some of which have the potential to escape to the environment.

2.3 Site PCB Release Pathways.

Release pathways at the Site for PCBs to enter the general environment include:

a.) Via groundwater discharge.

b.) Via surface water runoff.

c.) Via vapor and particulate releases to the atmosphere.

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two feet above 100 year flood level and upon remediation it will be completely above 500 year flood level.

b.) The difference between >25 ppm solids and <25 ppm solids solubility driven groundwater release is insignificant due to the chemical and physical nature of PCBs. [8.7; 8.8]

c.) The Site is not a spill site so the EPA Spill Policy is not directly applicable. [40CFR 761.120-.139] As discussed in Section 4.3.3.2 of these comments, leaving the PCB concentrations encountered in place is consistent with other EPA PCB policy pronouncements. The Site in its present condition does not release PCBs in concentrations that exceed drinking water MCLs or aquatic water quality criteria.

Groundwater would be expected to carry only dissolved PCBs while surface water will carry both a dissolved and particulate phase. Releases will also occur off-site. These include a catastrophic risk component as PCB-contaminated materials are moved from the Site to the disposal location. Releases will also occur at the disposal locations. Releases will also occur during and post-remediation.

2.4 Remediation and Post-Remediation PCB Release Mechanisms.

RI sampling has shown that the PCBs remain secured below ground at the Site, and that there currently are no mechanisms to release the PCBs to the air. If disturbed, the PCBs can move into air either through volatilization and coevaporation effects, or sorbed onto particulate matter. Volatilization, coevaporation, and the generation of particulates will start as the clean surface cover is peeled back and the contaminated soil exposed. Excavation will further increase the rate of release, especially of the particulate matter. Winds mobilize and carry PCB-contaminated particulate. Rainfall runs off and carries PCB contamination. Volatilization and coevaporation of PCBs will increase as the excavation size increases and the open working face becomes larger, exposing more contaminated soil and water to the air. PCB releases will continue as buckets of soil are dumped into trucks and hauled to staging areas, are placed on uncovered piles, are moved around during sampling and are re-loaded onto trucks and hauled off-site or back to the excavation area. Material falling off trucks moving across the site will be re-mobilized by other trucks riding over the same roads. Sprays of PCB-containing liquids will create air emissions during decontamination, road watering, and groundwater splashing. Generation rates will be increased or decreased by several factors, including the moisture content of the material, wind speed, ambient air temperature, and heating by direct sunlight.

This analysis considers nine specific mechanisms for the release of PCBs to the environment during digging and hauling PCB-contaminated soil materials as part of the proposed site remediation. The only mechanism for release of PCBs to the environment after remediation is dissolution in and discharge of groundwater.

2.4.1 Spray Formation.

When droplets of liquid containing PCBs are created, for example during spraying for decontamination efforts, some will remain airborne. These droplets will evaporate and ultimately leave a fine PCB-contaminated solid particle. As evaporation takes place, the particle becomes smaller and more likely to remain airborne and create a respirable solid particle. Larger spray droplets will temporarily suspend and may redeposit, depending on wind speed, particle density and evaporation rate.[13] If the redeposition is on-site, then the possibility of resuspension must be considered.

The physical layout of the Site, surrounded on two of four sides by the Delaware River and mud flats associated therewith with the bulk of the excavation and on-site transportation occurring along the river and mud flats, means that much of the large droplet fraction will redeposit directly into the water and not on the Site.

Liquid sprays will occur during decontamination operations and when dug material falls into water-containing excavations. Waves and the impact of rain drops are other possible mechanisms for contaminated droplet formation. Contaminated liquid droplet formation also occurs when a vehicle tire hits the wet, contaminated road. Liquid droplets may initially contain both dissolved and particulate phase PCBs.

An interesting aspect of droplet formation which is generally neglected is the tendency for hydrophobic compounds to concentrate in water in a surface micro layer.[14] This enriched layer generates a disproportionate share of droplets released to the atmosphere.[15] The net effect is that the small droplet is contaminated at levels higher than the bulk contamination in the source water even before evaporation of the droplet begins causing an increase in concentration. In fact the bulk concentration of a contaminant in a particle formed in this way is much less than the surface concentration of the particle. This becomes a critical concern when the particle reacts in the lung or elsewhere since the higher surface concentration increases the concentration that the lung, for example, experiences.

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[13] EPA has dealt with the environmental and public health problems associated with droplet formation from solutions containing a toxic substance in the context of hexavalent chromium in cooling towers. The use has now been banned by EPA utilizing authority found in Section 112 of the Clean Air Act, hazardous air pollutants ("HAPS"). Background documents in this HAPS' regulatory control process contain a discussion of droplet emissions and particulate formation and associated dangers. [8.16, 8.17]

[14] For a discussion of this phenomena see, e.g., C.P. Rice, et al.: "Role of Surface Microlayers in the Air-Water Exchange of PCBs", in D. Mackay, et al. (Editors), Physical Behavior of PCBs in the Great Lakes, Ann Arbor Science, 1983.

[15] For example, EPA studies of cooling towers show that over 90% of the toxic compound emissions from industrial cooling towers are contained in the smaller droplets, less than 30 μm. [8.17, Page 3-25.]

2.4.2 Coevaporation.[16]

PCBs are characterized by their low solubilities in water due to their highly hydrophobic nature. The PCB hydrophobic/lipophilic character increases and consequently the solubility in water generally decreases as the degree of isomer chlorination increases.[17] This increasing degree of chlorination is generally reflected in the increase in the last two digits of the Aroclor® 12xx designation. A quick analysis of this situation might suggest that since there are very low concentrations of PCBs in water, then evaporation from water must be an insignificant mechanism. However, this is not true.[18] In fact, the highly hydrophobic nature of PCBs results in a tendency to migrate from the water to the atmosphere "where wide and rapid dispersion may occur resulting in contamination of distant locations." [8.19, Page 5.]

Mackay discusses this escaping tendency:

> 'Fugacity' is the 'escaping tendency' of a substance and is the driving force that causes diffusion and partitioning between environmental compartments. Fugacity is analogous to temperature which drives heat transfer and determines heat equilibrium between phases. Just as temperature can be related to heat concentrations using a proportionality constant, heat capacity, fugacity can be related to concentrations using a similar fugacity capacity. Thus $C = Zf$ where C is the concentration of the substance, f is the fugacity and Z is the fugacity capacity.
>
> The physical significance of Z, the fugacity capacity, is that it quantifies the capacity of a phase for 'absorbing' the substance. Thus at a given fugacity, if Z is low, C is low and only a small amount of the substance is necessary to exert the escaping tendency. Thus substances tend to accumulate in phases where Z is high, in other words where high concentrations can be reached without high fugacities. Z depends on temperature, pressure, the nature of the substance and

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[16] Sometimes called codistillation.

[17] This depends upon the hydrophobicity of the various isomers with the same degree of chlorination.

[18] In fact one study of PCBs in the Hudson River estimates that some 2,000 pounds of PCBs are emitted from the water to the atmosphere yearly along a short stretch of the river. [8.18]

the medium in which it is present. [8.19, Pages 10-11.]

PCB movement from water to air phases is rapid as there is almost a three order of magnitude difference in fugacity. The rate of movement increases with the lower solubility and vapor pressure of the higher molecular weight isomers and Aroclors®. An early EPA publication calculates the theoretical vaporization half life of Aroclors from a one meter deep water column. [8.20, Page 43.] The table is reproduced below:

Table 2.4.2 Theoretical Coevaporation of PCBs from Water to Air [After 18.20]

Aroclor ®	Solubility (mg/l) [From 8.21, Page 104.]	Vapor Pressure (mm Hg @ 25 °C)	Half Life in One Meter Water Column	
1221	3.5[19]			
1232	1.45			
1242	0.288	4.06E-04	5.96 hour	
1248	0.054	4.94E-04	58.3 minutes	
1254	0.042	7.71E-05	28.8 minutes	Reversed in referenced document.
1260	0.0027	4.05E-05	1.2 minutes	

If there are no PCBs solubilizing into the water column, then, while the coevaporation is generally faster for higher Aroclors®, the amount actually released to the atmosphere is lower as there was less to start with. In the case of remedial operations at the Site, water in contact with PCB-contaminated materials will be continually refreshed with respect to PCB concentrations as the PCBs move into the water which has a depleted concentration due to coevaporation. This then becomes a mass transfer issue with all of the typical considerations of mixing within and between the phases.

2.4.3 Aeolian Particulate.

[19] In part, the solubilities of each Aroclor will differ over time as each Aroclor is a varying mixture of isomers with relatively constant average chlorine concentration.

Wind mobilizes surface particulate. Generally the smaller the particle[20], the more readily it is blown into the air and the more readily it remains airborne, all other factors being constant. Other factors include particulate density, wind velocity, and the cohesiveness of the soil.

2.4.4 Volatilization/Evaporation.

Liquids evaporate into the atmosphere when they are not contained. Many solids including ice, also sublime under atmospheric conditions. The rate of direct evaporation of a given substance is proportional to its vapor pressure at the subject temperature, the difference between vapor pressure and partial pressure of the substance, temperature, heat capacity and heat transmission rate. Wind moving over an open container of a liquid enhances the evaporation rate. PCBs typically have very low vapor pressures. Mackay [8.19, Page 29.] gives some estimates for vaporization of spills of PCBs which remain at or near the surface. These estimates are summarized in Table 2.4.4 as follows:

Table 2.4.4 Estimated Evaporation Rates for PCB Liquids On and Near the Surface. [After Mackay, 8-19]

Liquid	Evaporation Rate (%/day)
Aroclor®	0.16
Askarel® [PCBs in ClBz]	0.10
PCBs in Mineral Oil	0.0001

2.4.5 Spills During Handling.

The ROD proposed site remediation will involve the excavation of some 10,000 to 20,000 cubic yards[21] of PCB-contaminated material. This material will then be transferred to

[20] Potentially with higher effective contaminant loads than larger sized particulates.

[21] This range is an estimate derived by taking the lowest number advanced by the PRP Group and then applying a 100% factor based upon experience in excavating Superfund sites, actual excavated versus estimated to be excavated. Even the high number may be low if it is required that side walls be tested and that all materials such as smear areas which exhibit a sheen be removed.

piles and trucks at the excavation, transported, placed in staging piles at the front of the Site, transferred to trucks or other piles and sent to off-site disposal or returned to be dumped into the excavation. At each and every stage some of the material will inevitably be dumped or spilled to the ground while any liquids will drip to the ground.

While these spills will primarily occur at the excavation, along the haul road and at the storage piles, repeated truck, field vehicle, and equipment movement will spread the material. Anyone who has witnessed a major excavation and movement of soils remembers the haul road soon resembles the material being hauled.

2.4.6 Runoff from Contaminated Soils and Piles.

Rainfall runoff will further mobilize PCB-contaminated surface particulate and spread it on-site. Off-site movement of contaminated surface run-off during dig and haul remediation is probable unless strictly guarded against. How will the runoff be collected and treated?

Contaminated rainfall run-off is not a possibility with the Site Owner's plan since PCB-contaminated soils will not be disturbed and the present surface soils are not PCB-contaminated.

2.4.7 Suspension or Resuspension As Airborne Particulate.

PCB-contaminated particulate will become airborne due to vehicle traffic on-site. This is a significant source as anyone who has traveled an unpaved country road knows. Repeated traffic over the road tends to reduce the particle size, thus increasing particulate emissions.

Dumping of PCB-contaminated materials from back hoes, front-end loaders and trucks will create emissions.[22]

Resuspension also becomes an increasing problem during remediation as settled PCB-contaminated particulate is resuspended and moved further on-site or finally off-site. This also

[22] In fact, in May 1999 EPA was concerned that these types of activities from building demolitions near St. Vincent's School would create a risk for the adjacent students. [8.22] "The location of the buildings to be demolished, some of which are within 50 feet of a day-care center playground, heightens these concerns that the demolition activity be performed in a manner that does not disturb the contaminated soils." [8.23] EPA now proposes to disturb 10,000 to 20,000 cubic yards of actual PCB-contaminated materials, not mere uncontaminated demolition wastes and low PCB level courtyard soils, next to the school.

becomes an emission source when the Site is finally covered with clean soils as this activity will require vehicular traffic on these "clean" undisturbed soils which become contaminated during dig and haul remediation by aeolian deposition and surface rainfall runoff areas on the Site.

2.4.8 Airborne Particulate from Truck Loads.

Even with no ambient wind, a moving truck will cause its uncovered load of PCB-contaminated materials to experience aeolian erosion.

2.4.9 Solids and Water from Decontaminated Trucks.

The decontamination process typically[23] will involve spraying high pressure water over the readily accessible parts of an 18-wheel transport trailer and tractor. Solids and water will remain on the tractor and trailer. The liquids will drip and evaporate as the truck travels the highway. The residue of contaminated solids will also tend to be released.[24]

2.5 PCB Release Locations.

2.5.1 On-Site.

The bulk of the on-site releases will occur at three locations. PCB-contaminated materials will be excavated and handled at the location near the Delaware River and the mud flats and at the location next to St. Vincent's School. The haul road between these locations will effectively act as a line source of release.

2.5.2 Off-Site.

2.5.2.1 Along Route of Transport.

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[23] Other equipment will be spray cleaned but the highest percentage of use will be on trucks sent off-site. The decontamination and truck loading stations will be close to St. Vincent's School.

[24] The proposed location of off-site truck loading on-site will be contaminated in a fashion that contaminates the truck. After all, if the truck was not contaminated during its presence at the Site, it would not have to be decontaminated. The proposed location is adjacent to St. Vincent's School. This site is presently uncontaminated.

The transport trucks will release PCB-containing materials along the route of travel. (See Section 2.4.8.) A catastrophic release of PCB-containing materials somewhere along the line of travel is a probability. See Table 5.1.

2.5.2.2 At Disposal Sites.

Releases will also occur at disposal sites as truck loads are dumped, moved, compacted and covered.

2.6 Summary.

Figure 2.1 is a schematic diagram which summarizes the information relating to releases of PCBs[25] caused by dig and haul remediation at the Site, their locations, mechanisms, and pathways.

Figure 2.2 illustrates the differences in post-remediation environmental releases of PCBs between the dig and haul and the secure and treat plans.

[25] Other contaminants will also be released by the proposed dig and haul remedial plan which will not be released during the implementation of the Site Owner's Plan.

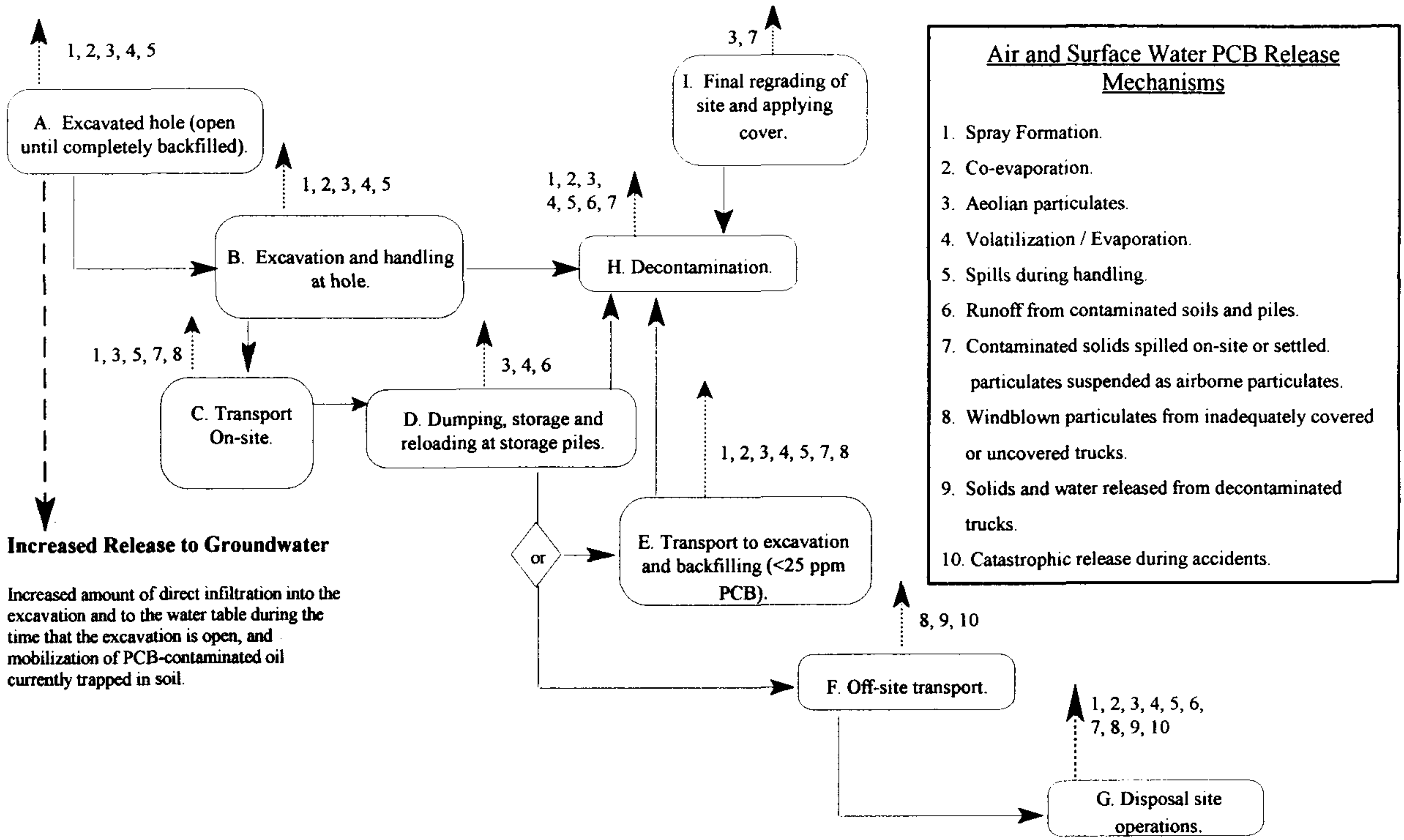

Figure 2.1. Schematic Diagram of Release Pathways for PCB Dig and Haul Remediation.

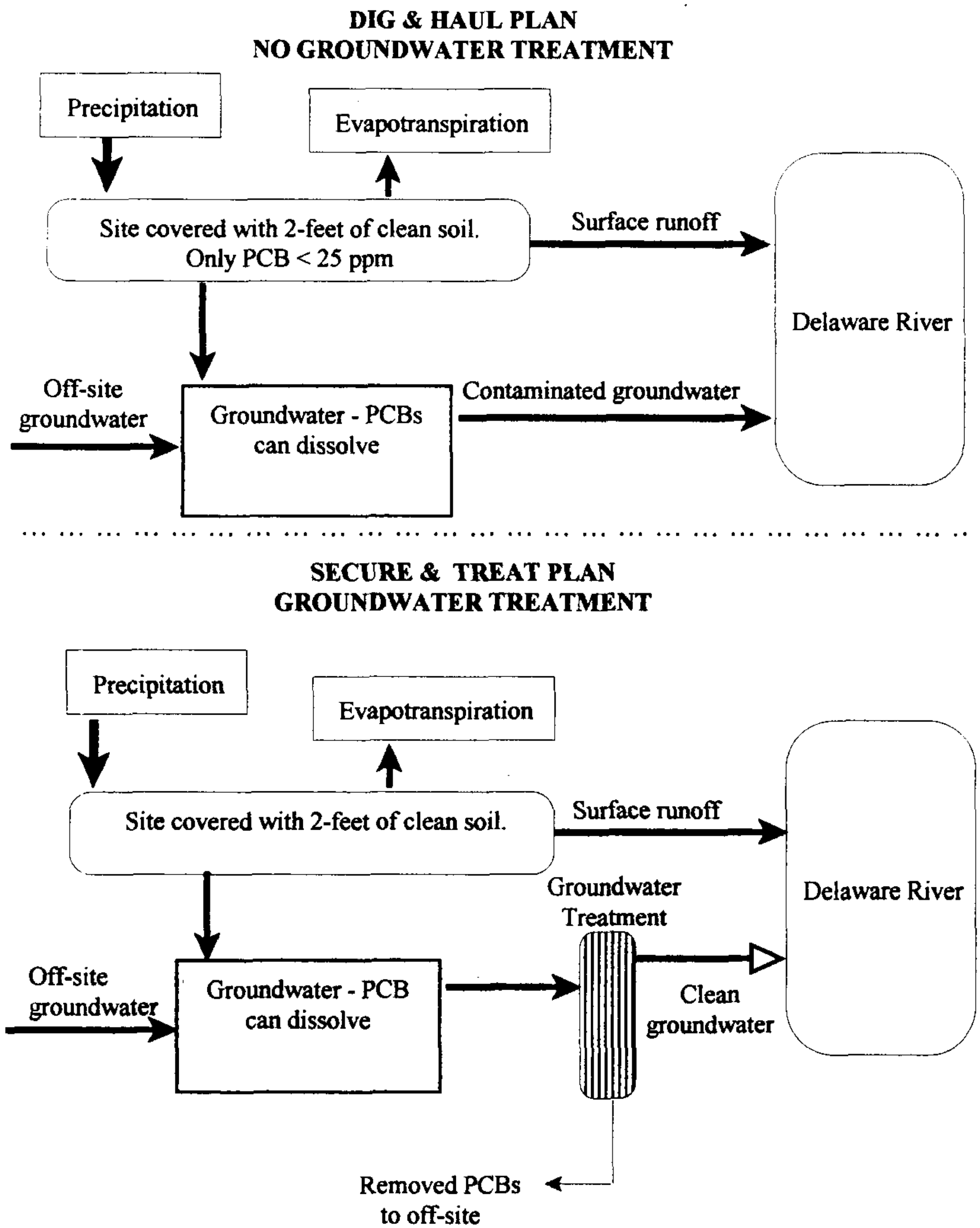

Figure 2.2. Post-Remediation Release Pathways.

3.0 Comparison of Amounts of PCBs Released During and Post Remediation.

3.1 Introduction.

In 1978 before any remediation directed to PCBs had been accomplished at the Site, the U. S. Coast Guard commissioned Roy F. Weston, Inc. ("Weston") to conduct a study of the Site. [8.24] At that time, the Site was actively seeping oil. Based upon the studies conducted, Weston calculated that the Site was releasing PCBs to the Delaware River through two pathways. The oil discharge was estimated at 20 gallons per year containing 0.2 pounds per year of PCBs. That oil discharge was stopped by the remediation undertaken by the Site Owner in the 1980s. In addition, Weston calculated that 0.0032 pounds per year of PCBs was leaving the Site dissolved in groundwater. This was not totally eliminated by the remediation in the 1980s to the extent that it was contaminated by contact with PCB containing soils. However, the remediation did meet and exceed the PCB groundwater concentration standard established in the controlling 1983 agreement.

The Site Owner's Comments to EPA's Proposed Plan calculated PCB emissions pre- and post-proposed remediation for one pathway: the groundwater to surface water release. Until the preparation of these comments, there has never been an attempt to calculate the damage done by a proposed remedial effort at the Metal Bank of America Cottman Avenue Site. These comments do not try to quantify the environmental cost of a proposed remedial plan for the Site and balance it against the environmental benefits of the action. We have simply demonstrated that the releases to the environment as a necessary condition of implementing a particular plan, dig and haul, are significantly in excess of those associated with a different plan, secure and treat.

The question can and should be asked with regard to a much more important issue. For expending $10,000,000 to $20,000,000 on further remediating the Site, what do we get in return?[26] How many pounds of PCBs per year will not be released from the Site after further remediation? That release can then be balanced against the release caused by the remediation. Are we keeping one pound of PCBs from releasing at a cost of five pounds released, or is it the reverse? That question will have to remain unanswered for now as these comments focus on a much smaller issue. The issue is in deciding between competing plans, which one provides the lowest release of PCBs to the environment?

[26] If the Weston figures are accurate and assuming a 100-year remedial life, the proposed EPA ROD plan will keep some 0.34 pounds of PCBs from discharging to the environment at a cost of some $30,000,000 to $60,000,000 per pound of PCBs.

The calculations in these comments do not cover all of the various release mechanisms at the various operations that characterize the proposed dig and haul remediation and are absent in the secure and treat remediation. Time to prepare these comments was short so that many of the PCB release pathways, as discussed in Section 2, have not been quantified. Those that have been quantified represent an initial calculation based upon simplifying assumptions. They represent ballpark numbers and could change if further detailed analysis is conducted.

3.2 Locations of Releases to the Environment During the Implementation of the Dig and Haul Plans.

As can be seen in Figure 2.1 each unit operation during remediation at the Site has PCB releases associated with it. These operations are connected by a flow of material. Each operation has been designated by a letter as illustrated in Figure 2.1.

A. The excavations themselves are sources. Most of the excavation will occur at the SA4/5 location next to the Delaware River and the mud flats. In this area, excavation will have to be into the groundwater.

B. The physical digging and handling PCB-contaminated material at the excavated hole will release PCBs to the environment.

C. Transportation of PCB-contaminated material from the excavation to the handling area will release PCBs to the environment.

D. Dumping, storage and reloading at the storage piles in the handling area will also release some of the PCB-contaminated material being handled.

E. Transport of low level PCB-contaminated material back to the excavation and backfilling will result in additional releases. Some of the backfill will come from the excavation in the first place. The PRP Group estimates this at 15% of the excavated material. Backfill will also have to be brought to the Site from off-site sources. Transport of this material on-site to the backfill location will result in further releases of PCB-contaminated material that are disturbed by the truck as it passes over contaminated surfaces. These trucks will also have to be decontaminated before they leave the site.

F. The transport off-site of PCB-contaminated material will release some PCBs to the environment. The truck will be decontaminated before it leaves the site but this process is never perfect as the decontamination process does not fully reach the undersides of the tractor-trailer combination. No one crawls under the truck with a pressure hose. If the load is not properly covered PCB-contaminated material will be blown off the trailer.

G. There will be PCB releases at the disposal site as the tractor-trailer travels over contaminated ground at the disposal site and as their load is dumped into the disposal cell. The load will be moved, leveled, and compacted and eventually covered by equipment at the disposal site. This will result in PCB releases to the atmosphere.

H. The decontamination process is a source of emissions of PCBs to the environment through several processes such as spray formation and coevaporation.

I. Regrading of the Site and applying final cover would not release PCBs to the environment if the present generally clean surface was not disturbed. By the time that the surface is regraded and covered at the end of the dig and haul remediation it will have become PCB-contaminated from the earlier processes discussed above.

3.3 Dig and Haul Remediation Excess PCB Emission Calculations and Estimates.

Table 3.1 and the accompanying notes constitute a matrix of PCB release mechanisms and PCB release points.[27] Each of the 90 matrix boxes can be classified as probable or not probable, the latter are filled in Table 3.1. Boxes without content indicate matrix points that have not been calculated because of time constraints. The boxes with numbers indicate the calculated pounds of PCBs emitted by the specified source by the specified mechanism. These PCB pounds are additive and represent the excess of PCBs emitted by the dig and haul remedial plan versus the secure and treat plan.

A full analysis to determine the sounder environmental plan would involve calculating values for each matrix box so as to weigh the total calculated PCB emissions to the environment from the dig and haul plan against those achieved with the secure and treat plan. These emissions would be greater than those calculated in these comments and therefore their

[27] In essence Table 3.1 puts Figure 2-1 into matrix form.

associated risks are higher.[28] Section 6 of these comments analyzes the potential impact of calculated PCB emissions from one source on St. Vincent's School.

3.4 Secure and Treat Remediation PCB Emission Estimates.

The dig and haul plans propose to control off-site releases of PCBs to the mud flats by removing greater than 25 ppm PCB-contaminated materials from on-site. The Site Owner's Plan proposes to capture and treat groundwater for PCB and other contaminant removal before discharge. In each case, the amounts of PCBs which will discharge under each proposed plan can be calculated and compared.

Using the soil/water partition method of calculation the dig and haul remedial plan results in a yearly discharge of 7.53E-03 pounds of PCBs. The Site Owner's Plan results in a yearly discharge of 0.08E-03 pounds of PCBs or 7.45E-03 pounds per year less. Utilizing the effective solubility method the dig and haul remedial plan results in a yearly discharge of 7.15E-03 pounds of PCBs. The Site Owner's Plan results in a yearly discharge of 0.07E-03 pounds of PCBs, or 7.08E-03 pounds per year less.

Table 3.2 summarizes the calculations and assumptions made in deriving the mass PCB discharge rates after remediation. Several worst-case[29] scenarios are also examined. In each case, the EPA's ROD plan releases more PCBs to the mud flats and the Delaware River after remediation has been completed than the Site Owner's Plan.

3.5 Groundwater Discharge Compliance with Standards.

Reference to Table 3.2 shows that after the implementation of remediation, the Site Owner's Plan will result in groundwater of such quality that it meets the MCL for drinking water of 0.5 ppb and the Ambient Water Quality Criteria of 0.014 ppb, the latter without requiring any dilution in the receiving waters.

While the Site Owner's Plan uses pathway elimination which is acceptable under

[28] It might be concluded that since emissions from the dig and haul plans are already proven to be greater than those from the secure and treat plan, then the latter plan is proven to be the better option. Why then bother to make additional calculations that will only make the comparison worse?

[29] Worst case for the Site Owner's Plan.

Pennsylvania Act 2, there are Pennsylvania Standards which allow for the direct exclusion of a site with no remediation required. Reviewing the groundwater release presently occurring at the site, 0.130 ppb, shows that the Pennsylvania numbers are conservative in protecting groundwater. A limited number of the samples obtained during the PDI[30] exceed the Pennsylvania numbers but the groundwater at the Site does not appear to exceed the 5 and 1 ppb PCB water standards.

[30] Seven samples total: 1 for Aroclor®1260 680 ppm versus 500 ppm; 1 for Aroclor®1254 323 ppm versus 280 ppm; and 5 for Aroclor® 1242 79, 100, 100, 140, and 535 ppm versus 67.

Table 3.1. Summary Matrix of PCB Sources and Release Mechanisms Related to Implementation of the EPA's ROD Remedial Plan.

Sources (Pounds of PCBs)	PCB Release Mechanisms[b]									
	1. Spray Formation.	2. Coevaporation.	3. Aeolian Particulate.	4. Evaporation.	5. Handling Spills.	6. Contaminated Runoff.	7. Resuspended Particulate.	8. Truck Load Windblown Particulate.	9. Decontaminated Truck PCB Release.	10. Releases Catastrophic & Accidental.
A. Open Hole.		1.6[f]		0.003 to 8[e]						
B. Dig & Handle.										
C. Transport On-site.			2 to 4[c]							
D. Dump, Pile, Store & Load.[a]										
E. Transport to Holes.										
F. Transport Off-site.									0.87 to 1.70[d]	0.08[g]
G. Off-site Disposal.										
H. Decontamination.	0.2 to 0.4[h]									
I. Regrade & Cap.										
Total Pounds PCB										

Table 3.1 Notes.

a. This operation is proposed for the area next to St. Vincent's School.

b. "Wave filled" boxes in the matrix indicate that the PCB release mechanism for that source is not considered to be probable. For example, there might be a catastrophic release from the SA4/5 excavation in a heavy rain if the sheet pile wall was not in place or the wall did not hold the release from escaping to the mud flats or the river.

Numbers in boxes are estimated pounds of PCB released to the environment from that source by that mechanism. These are preliminary, draft numbers subject to change.

Empty boxes indicate probable PCB release sources/mechanisms that, due to time and technical constraints, no PCB release estimates were developed. A complete analysis of the additional PCB releases to the environment from implementing the dig and haul remedial option would require that the PCB release for each empty box be computed, all of the boxes added and the total estimated PCB release compared to the calculated release from implementing the secure and treat option.

c. Calculated from models utilizing one source at SA4/5, a source at the handling area and a line source between them. A 10,000 cubic yard excavation is assumed to take 40 days with a 20,000 cubic yard excavation taking 80 days. Daily emissions are 251 pounds of particulate. Emissions from bringing backfill from off-site have not been calculated. Assumed that the road will quickly become contaminated therefore used 200 ppm as the PCB concentration. The average PCB for PDI samples greater than 50 ppm is 178 ppm. The particulate involved is fine and it will have a higher bulk and effective concentration than the material sampled during the PDI. EPA Guidance for risk assessments calls for using the 95th percentile concentration obtained or the highest value obtained. The high value is Sample 19B-03 at 680 ppm of Aroclor® 1260.

d. Decontamination of an 18 wheel tractor-trailer combination carrying 40,000 pounds of load and weighing a total of 80,000 pounds is not complete. Typically only the sides of the rig are sprayed as the inside of the tires and the underside of the tractor-trailer are not readily reachable. The spray water may also be recycled and have a PCB content. The amount of soil carried by an uncleaned truck can be significant as demonstrated by a trip to any construction site. It is conservatively estimated that each decontaminated large truck will carry 5 pounds of soil from the site, other than its load. The calculation used 870 and 1,700 truck trips to the Site, a figure found in Table 5.2. See Table 3.1, Note c.

for PCB concentration.

e. The FFS calculates 8,000 gallons of oil in the ground. We dispute this number but for sake of argument assume that this much oil is open in the excavation for 30 days. The oil tested at 808 ppm PCB. Using Table 2.4.4 evaporation rates for PCBs in mineral oil and Aroclor® this yields an emission of 0.003 to 8 pounds of PCB assuming a density of 15 pounds per gallon. The lower number is probably the most accurate given that the oil is most likely mineral oil from PCB contaminated mineral oil filled transformers.

f. Assume the hole is 5,000 square feet with a water depth of three feet. Assume that the water is saturated with each particular Aroclor® 1242 and above and the PCBs lost to the atmosphere through coevaporation are replenished at the end of each half life, that is there is no mass transfer restriction from the soil/oil phase into the water. Finally, assume that the hole is open for 100 days. Using 1,840 liters for the volume of the water and values found in Table 2.4.3, there are 530 mg. of Aroclor® 1242 and 5 mg. of Aroclor® 1260 in the water. Given the number of half lives in 100 days the loss of PCBs to the atmosphere can be calculated. This amounts to 106 grams of Aroclor® 1242 and 300 grams of Aroclor® 1260 released over the 100 days. Note that the fugacity of Aroclor® 1260 results in a greater release than that of Aroclor® 1242 despite the latter's 100 times greater solubility. Calculations for Aroclors® 1248 and 1254 have been made. Similar calculations could be made for additional Aroclors® which are known to be present at the Site.

g. A truck accident may release PCBs. The bulk of the risk of release is in the trucks moving to the PCB landfill as it is further and the PCBs in the waste have higher concentrations. Using the high volume scenario, 20,000 cubic yards excavated, and the data from Table 5.2, 430 trips of 420 miles are made. Comparing the total milage to truck accident statistics, 2.2 accidents per million miles traveled [8.25, Page 235.], the accident rate is calculated. Assuming 10% of these accidents release the entire 40,000 pound 200 ppm PCB load and only 75% is recovered, a PCB release to the environment from implementing the dig and haul plan is calculated.

h. The decontamination facility proposed for the Site will have to decontaminate between 870 and 1,700 large trucks. We assume for purposes of calculation that nothing else is decontaminated, when, of course, this is not accurate. Assume each undecontaminated truck has 50 pounds of PCB contaminated material attached of which 90% is removed during decontamination. A high pressure water spray using settled and recycled water is assumed to be used. Each large truck is assumed to require 50 gallons of water containing dissolved and fine particulate related PCBs at a concentration of 1 ppm. Of the solids blown off the truck one percent are assumed to become airborne. With this base, PCB releases are calculated.

Table 3.2 Secure and Treat Remediation PCB Emission Estimates.

Soil/Water Partition Methodology Calculations						
Post Remediation Solubility (ppb)			Post Remediation Mass Discharge (pounds per year)[a]			Net Benefit of Site Owner's Plan (less pounds of PCBs released per year)
Site Owner's Plan		EPA's ROD Plan	Site Owner's Plan		EPA's ROD Plan	
Before Treatment	After Treatment[b]		Before Treatment	After Treatment		
			0.00048[c]			
0.130[d]	.0013	0.118	0.0083[e]	0.00008	0.00753	0.00745
Worst Cases for Site Owner's Plan Calculations						
0.678[f]	0.0068	0.155[g]	0.0434	0.00043	0.00989	0.00946
0.740[h]	0.0074		0.0472	0.00047		
13.2[i]	0.132		0.843	0.00843		
0.130[j]	0.065		0.0083	0.00425		
Effective Solubility Methodology Calculations						
Post Remediation Solubility (ppb)			Post Remediation Mass Discharge (pounds per year)[a]			Net Benefit of Site Owner's Plan (less pounds of PCBs released per year)
Site Owner's Plan		EPA's ROD Plan	Site Owner's Plan		EPA's ROD Plan	
Before Treatment	After Treatment[b]		Before Treatment	After Treatment		
0.112[k]	0.00112	0.112	0.00715	0.00007	0.00715	0.00708

Table 3.2 Notes.

a. Three estimates of groundwater flow from the Site have been made. Weston calculated 1,300 gpd [8.24], HMM calculated 10,437 gpd [8.13] and Brown calculated 13,699 gpd [8.8]. The higher and rounded value has been used here, 14,000 gpd. There are apparent differences between the survey conducted during the RI and that conducted during the PDI. The flow number used is based upon the RI survey data. Since this is a comparative analysis the usefulness of the results is not impaired even if the RI data are inaccurate.

b. Activated carbon treatment for PCB removal will consistently achieve over 99% removal.

c. Weston 1978 calculation corrected for density of PCBs versus water. Note that with oil discharging from the Site, Weston calculated that it carried only 0.2 pounds of PCBs into the mud flats and the Delaware River.

d. Average levels found in 1995. [8.8]

e. This is the current release from the Site.

f. Maximum levels found in 1995. [8.8]

g. B-17 sample at 26 ppm.

h. Used highest PCB level found in 1999 and partition coefficient found in 1995. Since TPH not done in 1999 specific partition coefficients for specific 1999 samples cannot be calculated.

i. Used highest PCB level found in 1999 PDI of 680 ppm and lowest partition coefficient found in 1995.

j. Assume only 50% treatment at average levels.

k. Used 1999 oil PCB concentration and solubility of Aroclor® 1242, 808 ppm and 288 ppb.

4.0 Comparison of Remedies with Other Feasibility Study Criteria.

4.1 Introduction.

The FFS uses EPA's nine Superfund evaluation criteria. These are generally required to be used in assessing remedial alternatives which comply with the National Contingency Plan ("NCP"). The evaluation criteria incorporate the statutory requirements of Section 121 of the Comprehensive Environmental Response, Clean-up, and Liability Act ("CERCLA") of 1980 as amended in 1986 by the Superfund Amendments and Reauthorization Act ("SARA"). EPA guidance [8.26] further breaks these nine criteria into three groups.

4.2. Superfund Evaluation Criteria.

4.2.1 Threshold Criteria.

Threshold criteria are requirements that a remedial alternative must meet in order to be eligible for selection. They include:

a.) Overall protection of Human Health and the Environment.

b.) Compliance with Applicable or Relevant and Appropriate Requirements ("ARARs").

4.2.2 Primary Balancing Criteria.

These criteria are used to evaluate the effectiveness of each alternative and to identify the advantages and disadvantages of each. Primary balancing criteria include:

a.) Long-term Effectiveness and Permanence.

b.) Reduction of Toxicity, Mobility, or Volume Through Treatment.

c.) Short-term Effectiveness.

d.) Implementability.

e.) Cost.

4.2.3 Modifying Criteria.

These criteria are evaluated after the Feasibility Study ("FS") and are documented in the Record of Decision. CDM did not evaluate these criteria since they do come after the FS has been completed. The FFS does discuss these criteria for the ROD Plan.[31] These criteria include:

a.) Support Agency Acceptance.

The secure and treat option is perfectly acceptable under the PaDEP Land Recycling, "brownfields," Program, Act 2.[32] While the EPA is concerned with removing PCBs in concentrations greater than 25 ppm, the Act 2 standards allow 10,000 ppm[33] of each Aroclor® to remain on site if covered with a two foot clean soil cap.

b.) Community Acceptance.

The "community acceptance" of EPA's Proposed Plan of 1995 is based upon a public hearing.[34] New information since that time renders many of EPA's statements made at that hearing inaccurate. For example, the UST is not some major source of PCBs waiting to discharge to the Delaware River. Sediment PCB concentrations in the Delaware River and mud flats have decreased. The Site is not the source of discharge of PCBs to the river, the sources are storm and sanitary sewers and sewerage treatment plant outfalls. [8.15]

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[31] As noted in the FFS the Site Owner did present comments to the EPA in regards to the plan. We do not accept the characterization in the FFS of these comments or the adequacy of EPA's response. Since these comments are part of an attempt to settle the litigation, we will not comment further in regard to this issue.

[32] The FFS, at the last page of Table 2.3, states that Chapter 250 of PA Code Title 25 "[e]stablishes recommendations for recycling activities on Pennsylvania lands." "Used to guide waste disposal and storage activities considered recycling activities." In fact Sections 250.304 and 250.305 establish clean up levels for soil and groundwater in Pennsylvania.

[33] For Aroclor® 1260 the number is 190,000 ppm or about 20%.

[34] The Site Owner submitted comments for the Administrative Record with regard to EPA's statements at the Hearing and the inaccurate portrayal of the Site and proposed remediation. No one from St. Vincent's School was at the public meeting nor were comments received from them.

In addition, a range of traffic activity can be estimated from information presently available. Based upon an estimate of 10,000 to 20,000 cubic yards to be excavated with an 85% off-site movement rate, waste trucks will make 425 to 850 trips during the excavation.[35] There will be many additional trucks moving to and from the site, carrying fill[36], piling, excavation equipment, etc. We do not believe that this will be acceptable to close neighbors.[37,38]

4.3 Critique of the FFS Analysis of the Remedial Plans.

4.3.1 Introduction.

We have evaluated the discussion in the FFS which results in a scoring of the remedial plans. The FFS uses a scale of low, low to medium, medium, medium to high and high. This scale can be replaced with its numerical equivalent or five point scale. Using this numerical scale, 1 = Low and 5 = High, the total score of each of the remedial plans can be calculated.[39] In this scoring system, the best plan has the highest aggregate score. After a critique of the discussions in the FFS used to score the criteria, we have rescored the plans. The Site Owner's Plan is clearly the best. The critique of the discussions relating to each plan's performance as measured by each criteria is presented in the following sections of this report. It is also summarized in Table 4.1. Numerical scoring of the FFS ratings and a rescoring of same based upon the critique is summarized in Table 4.2.

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[35] In an effort to be conservative we have underestimated the weight of a cubic yard of material to be transported. Assuming not a 1.0 ton per cubic yard ratio but a more accurate 1.7, lower than dry clay with soil but higher than dry sand and a typical truck capacity of 22 tons per load, the number of truck trips for waste hauling only is between 670 and 1,300 truck trips. See Figure 5.2 for additional information on truck traffic to the Site as created by the dig and haul remedial plans.

[36] Backfill in the amount of the net material excavated plus the volume between the bank and sheet pile wall less the sediments disposed on site is required under the EPA and PRP Plans. This can amount to a doubling of the number of trucks which have to come to the Site.

[37] A number of people at the public hearing were interested in using the Site as part of a bike path system. None of the remedial options presently under consideration allows for this.

[38] Recently there has been a series of heavy truck accidents in Philadelphia, many of them involving waste hauling vehicles.

[39] Each criteria is equally weighed.

4.3.2 Critique of the FFS's Evaluation of the Dig and Haul Plans.

The fundamental problem with both dig and haul plans is that they release more PCBs to the environment during implementation than the secure and treat option. The options are complex, and will require careful coordination and control of multiple dependent phases and activities. Each phase and activity will require the implementation of several overlapping engineering controls to be successful. Given the complexity of the project and the nature of the Site, engineering controls during the dig and haul remediation cannot be depended upon to eliminate these releases because engineering controls are not perfect, and more importantly, are subject to human error.

4.3.2.1 Overall Protection of Human Health and the Environment.

The FFS scored the ROD as High[40] in this area, and the PRP Group as Medium to High. The difference between the two was due to the uncertainty associated with being able to remove all LNAPL. However, each of the dig and haul options:

a.) Are calculated to release PCBs at rates greater than the secure and treat option.

b.) Do not include any containment and treatment system to address groundwater.

c.) The ROD LNAPL collection system depends on open trenches for LNAPL collection.

d.) The FFS points out that additional remedial actions may be needed if monitoring indicates that not all the LNAPL has been removed by excavation under the PRP Group's plan. However, the FFS fails to incorporate the time required to respond to such a finding, a period during which releases may be occurring. Because of the permanent LNAPL containment and collection systems, this problem is not associated with either the ROD or the Owner options.

The FFS also bases its scoring on statements that have little or no relevance in scoring the differences between the plans or are complete misstatements of facts. The ROD alternative "provides protection against direct contact with contaminants in the soils...and minimizes windblown dispersion by removing waste and transporting it to an offsite disposal facility." Studies at the Site have shown that there is presently no danger of direct contact with Southern

[40] CDM apparently took the ROD as absolutely correct and did not critically analyze it.

Area soil contaminants[41] nor is wind dispersion even a possibility. The Site is presently covered with clean soils which support vegetative growth.[42] The FFS goes on to try and turn these two misstatements of fact into support for the ROD Plan. "A high degree of overall protection will be realized by removing the most highly contaminated soils...thereby reducing the risks of human exposure via ingestion and inhalation." There is presently no risk of these effects. The statement is backward, as we have seen in previous sections, as these ingestion and inhalation risks will be created by implementing the ROD and PRP Plans.

In discussing the ROD Plan the FFS rightly notes that the material labeled as LNAPL "is not expected to be very mobile..." The risk to a future construction worker is highly speculative and can be eliminated by institutional controls. There was certainly more exposure to oil during the PDI than possible to a future construction worker. What would a construction worker even be doing in the limited area where oil is found, especially immersed in the oil?

The statement that a sheet pile wall will prevent erosion[43] is valid for all of the plans, (recognizing that the PRP Plan does not propose a complete wall) but only if the sheet pile is installed outboard of all of the rip rap, that is at the base of the shingle leading to the actual mud flat on the mud flat side. From an engineering prospective it needs to be installed at this location where stray rip rap will not cause sheet pile deformation during installation. The ROD Plan seemed to call for installation of the sheet pile through the rip rap which is technically not feasible.

4.3.2.2 Compliance with ARARS.

Primary Federal ARARs for treating or managing PCBs derive from the Toxic Substances Control Act ("TSCA") and its PCB Regulations, and the Resource Conservation and

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[41] Indeed, any contaminants presently at the surface of the Site were deposited there during the Remedial Investigation, pit excavations for stabilization/solidification treatability studies and Preliminary Design Investigation.

[42] All three plans destroy the existing Southern Area habitat which presently supports a large wildlife population including geese, deer and foxes.

[43] Of course, erosion is not presently significant, at least for PCB contaminated materials, based upon sediment sampling results at the Site and 20 years of visual observation which show no erosion taking place. In fact, rather than erosion there has been in-fill in the mud flats over the last 20 years.

Recovery Act ("RCRA"). Because the Site Owner's Plan does not call for excavation and disposal of subsurface PCB-contaminated materials, none of which amount to "principal threats" under CERCLA, the portions of these ARARs which govern storage, handling, transportation and disposal of contaminated wastes are not implicated. The PCB Spill Policy and the PCB remediation waste regulations under TSCA should be considered in devising an appropriate remedy where applicable. Requirements that derive from the Clean Water Act ("CWA") and Safe Drinking Water Act ("SDWA") and their implementing regulations apply as relevant and appropriate to the extent that the Site involves surface and/or groundwater contamination.

The PCB Spill Policy, at 40 CFR Sections 761.120 - .139, describes the level of cleanup required for PCB Spills occurring after May 4, 1987 (the effective date), so it is not directly applicable to the Metal Bank Site. Moreover, the Spill Policy is geared to addressing point source surface spills and direct contact risks[44] rather than the groundwater issues perceived as the basis for subsurface soil remediation at this Site.[45]

The self-implementing cleanup provisions of the PCB Remediation Waste Regulation, 40 CFR Section 761.61, although not binding on CERCLA cleanups, should certainly be considered in remedy selection. Under this regulation the 25 ppm general cleanup standard for low occupancy areas is increased to 50 ppm where, as here, the site will be secured by a fence with appropriate signage, and an appropriate deed notice is filed. This level is further increased to 100 ppm if the site is covered by a compliant cap. 40 CFR §761.61(a)(4)(i)(B)(1)-(3).[46]

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[44] The sources at the Site are sub-surface area sources and are not surface sources. The surface at the Site was demonstrated to be clean by testing done during the RI.

[45] The Policy has possible application to the Courtyard area which involves surface soils. As discussed at length in the Site Owner's prior comments, the policy was misapplied in arriving at a 10 ppm cleanup standard for that area since the policy recommends that contaminated soil in restricted access areas be cleaned to 25 ppm (or to 50 ppm as stated in the CERCLA Guidance (Section 3.1.2)). Even under the CERCLA Guidance, PCB levels in the range of 10 to 25 ppm are an acceptable risk. The PCB Remediation Waste Regulations allow PCB remediation wastes to remain with concentrations of up to 100 ppm under appropriate conditions. Pennsylvania Act 2 Standards are discussed above at Footnotes 31 and 32, and accompanying text..

[46]The Remediation Waste Regulations also provide for an alternative risk-based cleanup. The Site Owner's prior comments have documented that current sub-surface concentrations do not pose an unacceptable risk.

For addressing groundwater that is or could be a drinking water source, the Maximum Contaminant Level of .5 ppb proposed under the Safe Drinking Water Act is "to-be-considered." The Clean Water Act establishes requirements and discharge limits for actions effecting surface waters, for both human ingestion and for aquatic life. The Site's ground water is not used for drinking water. The only concern is the perceived potential for PCB contamination caused by its discharge to the surface waters of the Delaware River.

Although EPA's Guidance on Remedial Actions for Superfund Sites with PCB contamination suggests that "PCB soil cleanup levels based on direct contact assumptions will provide sufficient protection of ground water," there is no stated policy for establishing this at 25 ppm or any other number. Nevertheless proper application of the direct contact standards would permit concentrations in excess of 25 ppm in appropriate situations, including site-specific risk-based scenarios. According to the EPA Guidance, the threat to groundwater from a 20 ppm PCB source "is not significant" (.4 ppb) even with only a soil cap. This Guidance concludes that even "at 50 ppm, PCB concentrations in ground water are projected to only exceed the .5 ppb level slightly - - approximately 1 ppb."

The Site Owner's prior comments to the plan eventually accepted in the ROD, demonstrated that there is currently no discharge from the Site to the Delaware River which exceeds proposed or established water quality criteria.

The FFS fails to evaluate Pennsylvania's Land Recycling Act and program regulations derived therefrom which should be evaluated as an ARAR. These regulations provide for a pathway elimination option where there is low mobility in ground water as present here. [8.27] By providing for containment and treatment, the potential groundwater pathway is eliminated under the Site Owner's Plan and complies with this Pennsylvania based ARAR.[47] In this regard, the Site Owner's Plan also satisfies the CERCLA and National Contingency Plan's preference for remedies that permanently and significantly reduce mobility of PCBs while providing treatment to remove them prior to discharge from the Site to the river. It meets all ground and surface water ARARs and TBCs. This result is achieved on a more cost effective basis then in the dig and haul plans.

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[47]The EPA Guidance acknowledges that in certain cases it may be appropriate to contain principal-threat (none of which are established here) as well as low-threat materials because they constitute large volumes of contaminated material, they are mixed with other contaminants that make treatment impracticable, or because they are not accessible, e.g., sites where they are buried. [Guidance, §4.1.] EPA's risk assessment for and PCB-concentrations at the Site demonstrates that the Site is a low to no-threat site in its present condition.

4.3.2.3 Long-term Effectiveness and Permanence.

There are additional uncertainties associated with the PRP Group's proposed remedy for LNAPL.[48] Successful excavation to remove LNAPL is not a certainty[49], and the difficulties are magnified by the non-uniform nature of the subsurface materials. Trenches have to be left open to collect LNAPL thus insuring increased emissions of PCBs, employee contact risks and trespasser injury. In addition, under both dig and haul plans the open trenches and excavations will eventually be closed, leaving no method to recover any LNAPL subsequently discovered. This is especially critical since a separate and uniform layer of LNAPL has not been found, only reports of spotty sheens and non-measurable thicknesses.[50] The FFS also did not take into

[48] It appears that EPA wants the PRP Group to excavate all "LNAPL" by which it is meant that side walls in the SA4/5 area must be excavated until there is no sheen created. Experience with the Site and with oil contaminated ground generally shows that means that all of the site material up to the sheet pile wall will most likely have to be excavated along with additional site material on the up-river side of the excavation. Excavation inevitably mechanically creates the sheen as oil-contaminated material is mixed with water. The sheen, which can be a mono-molecular layer, does not exist in the natural state but is created in open water by the act of excavation of oil-contaminated soils. Excavated materials could easily exceed 20,000 cubic yards, although we have used this number as an upper limit for the calculations in Section 3.

[49] What is a certainty in removing liquid and solid mixtures from below the water table is that there will be significant amounts of leakage and spillage. The materials cannot be dried in the excavation since it is at or below the water table. Any attempt to add drying agents such as quick lime will increase the volume to be disposed and the related costs.

[50] For the purposes of these comments the issue of the existence of LNAPL is moot. The Site Owners' Plan includes a LNAPL collection and recovery system in the interest of settlement and because it is relatively inexpensive compared to the total expenditure for the ROD remediation. However, there are several points that need to be made with regard to CDM's handling of the issue in the FFS. CDM's estimate of LNAPL quantity is flawed. Piezometers are not monitoring wells and cannot be accurately used for purposes other than determining piezometric heads. CDMs calculation does not include the fact that the soil particles occupy most of the space, that is, there is no adjustment for soil porosity. Even if CDM wants to assume that small diameter piezometers can be used to determine free oil levels, they have to make an adjustment in effective height due to the fact that light oils in wells rise in the wells higher than their level in the geologic formation, up to ten times as high. "In summary, proven field methods

consideration the time delay in responding to a finding of LNAPL while monitoring under the PRP Group's plan. Once detected, time will be spent in confirming the occurrence, deciding on a plan of action, receiving approvals, and implementing actions, time during which releases can occur.

4.3.2.4 Reduction of Toxicity, Mobility or Volume through Treatment.

The FFS states that off-site disposal "in a regulated landfill will also reduce the mobility of Site contaminants." We continue to point out that the on-site contaminants of concern, PCBs, are already immobile in the Site. Evidence shows[51] that PCBs presently on-site are not moving off-site. There is not one piece of information obtained during any technical study of the Site, after the Site Owner completed agreed upon remediation in the 1980s, that factually documents off-site movement of on-site PCBs, either in groundwater or separate oil phase.

As discussed in previous sections, the proposed dig and haul remediation actually mobilizes contaminants and releases them into the environment. At best it merely moves them around instead of removing them from the environment.

Neither of the dig and haul options result in any permanent or significant reduction in toxicity or volume. The FFS correctly rated the ROD alternative as low to medium in this category. However, the FFS scored the PRP Group's similar proposal as medium to high. The basis for this was that the latter option might reduce the volume of LNAPL that might be collected during dewatering by excavating it. This is incorrect. Neither LNAPL removal proposal is fail safe.

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for accurate and reliable estimation of mobile LNAPL volume using well thickness are not currently available." [Ground Water Issue--Liquid Nonaqueous Phase Liquids, EPA/540/S-95/500.]

If CDM in its FFS wants to conclude that LNAPL is present at the Site then they need to explain why MW-6 and MW-7 have no oil in them and why the test pits in the area in 1995 had no oil in them even though they went to the water table. CDM also needs to explain the observation that once oil was removed from a piezometer at the Site in 1999 it did not build up again. This effect would not be observed if there were a true LNAPL layer in the area.

[51] See sediment data for example.

4.3.2.5 Short-term Effectiveness.

The FFS identifies the potential for adverse impacts and releases to the environment associated with the excavation and transportation requirements of the dig and haul options:

a.) Hazards to site workers by heavy equipment and machinery.

b.) Inhalation and ingestion of contaminated dust.

c.) Dermal contact with contaminants.

d.) Increased potential for an off-site release.

e.) Truck traffic passing close to Saint Vincent's School.

f.) Trucking over roads.

The FFS states that "the short-term impacts associated with excavation and transportation can be readily addressed through the use of proper equipment and handling techniques." As shown in previous sections of this report, this is a tautological statement that is meaningless and misleading. Emissions of PCBs are inevitable with dig and haul techniques notwithstanding the greatest precautions. They can be reduced if time and money are expended and the precautions properly implemented but they cannot be eliminated.

The FFS states that risks to workers can be "minimized." That is true but what does this amount to? This risk number is determined in Sections 5.0 and 6.0 of this report. It is higher than any risk determined by EPA and posed by the Site at the present time.

The FFS states that truck traffic "may pass close to the St. Vincent's School located across the street from the Site." Stating this as a mere possibility is just nonsense. Truck traffic will pass, up to one to two thousand very large trucks. Truck accident probability can also be determined. This is presented in Sections 5 and 6. In fact, the PRP Group's design places the main operation of staging and truck loading next to the St. Vincent's School day care center playground. The time allotted by EPA for these comments did not permit assessment of the risks to parents, students, visitors and workers at St. Vincent's School from this concentrated heavy truck traffic required by the implementation of either of the dig and haul plans.

The FFS states flatly that "release to the environment from a transport accident is expected to be low." This is an example of a consistent pattern in the FFS, while discussing the

ROD remedy, to substitute opinion for science without scientific grounds where the scientifically derived answers to the problem are possible but will be unpalatable to EPA. Engineering controls have been used in industry for years to prevent accidents and promote safety. To this date there is still a definable industry accident rate.

4.3.2.6 Implementability.

In analyzing all of the plans no issues of implementability have been found other than assuring that the sheet pile is outboard of the riprap[52] and the technical impossibility of a cofferdam 100 feet into the Delaware River.

The FFS fails to identify several potential difficulties with the dig and haul options:

a.) The close proximity to the Saint Vincent's School will require coordination of materials, trucks and equipment around the early morning and late afternoon "rush" times for dropping off and picking up children. If this is not feasible, then the dig and haul options may require temporary relocation of the facilities at St. Vincent's School or working at night, which again creates difficulties with implementing these alternatives.

b.) The dig and haul options depend on a large number of steps (See Figure 2.1) to accomplish. There will be a large number of trucks and equipment moving back and forth on-site, and hauling material from and to the Site. This will require a great deal of coordination and communication to ensure smooth operations, again creating difficulties in implementing these options.

c.) To be effective, the PRP Group's option requires that all the LNAPL be in the areas excavated and in a physical state that allows it to be recovered using excavators, booms and sorbents without pumping. This will be difficult if not impossible to accomplish.

d.) If the PRP group's plan is attempted and LNAPL is found during long-term monitoring, the option has failed, by definition. LNAPL was not removed by excavation and there will be difficulties in responding quickly while releases are

[52] It may be necessary to add batter piles to get sufficient support for the sheet pile wall but this is not a technically difficult problem and we included the additional costs in the Site Owner's Plan cost estimates.

occurring. There will be no existing remedial options for removing LNAPL. Additional remediation will have to be evaluated and implemented.

e.) Dig and haul options depend on engineering controls to minimize accidents and releases. Engineering controls are not fool-proof, and difficulties will be encountered, especially given the sheer size and complexity of the dig and haul options.

4.3.2.7 Cost.

Costs have been recomputed where problems exist, and placed on a common basis. While absolute values may ultimately not be exact, they provide a sound basis for comparing relative costs. As CDM has no doubt learned, this is difficult.

The FFS contained an evaluation of the costs associated with the dig and haul options. These costs mixed numbers from the FS, from later documents, and from various sources. Table 4.3 provides a revised set of numbers for both the dig and haul options and the secure and treat option. All costs for the remedy, including items not associated with the Southern Area, have been included. The costs for just the Southern Area have been calculated as well. The table also provides an explanation for using the sources referenced. The absolute values may be incorrect but comparable costs have been developed.

One of the major problems with the dig and haul plans is that the calculated costs are not controllable but are dependent upon the amounts of materials encountered, excavated and hauled to various disposal sites. The costs of the secure and treat plan are hard numbers while those of the dig and haul plans are soft. The degree of softness will not be known until the end of the excavation is reached.[53] What is known through experience is that the amount excavated will not decrease. The amount of sampling during the PDI has identified the minimum that must be excavated. As sidewall samples are collected, some areas will require additional excavation. So the costs for both dig and haul options should be viewed as the minimum costs to be expected.

The dig and haul plan cost estimates are projected to be more than the secure and treat option:

a.) The ROD Plan, modified to include the revised design of the sheet pile wall, is

[53] The PRP Plan apparently developed estimates based upon digging only to a surveyed location and not until the sidewall is "clean."

projected to cost $12,900,000.

b.) The PRP Group's Plan is projected at $10,588,000 with no provision for excavating more materials than projected.

4.3.3 Critique of the FFS's Evaluation of the Secure and Treat Plan.

4.3.3.1 Overall Protection of Human Health and the Environment.

The FFS rated the secure and treat plan based on a statement that this option provided the lowest protection of groundwater. In actuality, this option is the <u>only one that treats groundwater</u>. Therefore the Site Owner's Plan is more protective of groundwater than any other options. Based on calculations in Section 3, this option results in the lowest amount of PCB releases via groundwater, during remediation, and overall.

The FFS states that "direct human contact with contaminants...is minimized" by various aspects of the Site and the Site Owner's Plan. This is incorrect. It is completely eliminated, as no completed pathway is present absent unauthorized excavation. Unauthorized excavation will give rise to direct contact risks under all plans.

The Site is not in the flood plain.[54] The statement in the FFS to the contrary is in error.

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[54]The flood elevation in the area of the site is 10 feet, based on the National Geodetic Vertical Datum ("NGVD") 1929 as reported by the Federal Insurance Administration. [8.28] Ground surface elevations measured at the Site to the NGVD 1929 datum range from 11.8 to 16.4 feet, indicating that the Site is at least 1.8 feet above the 100-year flood plain. The latest topographic survey of the site shows that the top of the rip-rap is at an elevation of 11 feet or more. This last survey references a datum of "NGVD 1988". However, this probably refers to the North American Vertical Datum ("NAVD") of 1988, the last general adjustment of the datum. Comparing surveyed monitoring well elevations for both the NGVD 1929 and the NAVD 1988 surveys indicates a general correction of site elevations of between -0.42 and -2.87 feet from the earlier to the later datum. Applying this correction factor to the Flood Insurance Rate Map flood stage of 10 based on NGVD 1929 results in an approximate 100 year flood stage for the site area of between 9.58 and 7.13 feet if measured using NAVD 1988. Therefore, the top of the rip rap at an elevation of 11 feet or more is well above the 100-year flood stage of 7.13 to 9.58 feet, and the site is not in the flood plain as it presently exists. The additional two foot thick cover to be applied under all current remedial plans will raise the Site further above flood stage.

In fact when the Site is fully remediated under the Site Owner's Plan it will be at least four to five feet above the flood plain.

4.3.3.2 Compliance with ARARS.

As noted, the Site is not within the flood plain so this portion of the FFS evaluation is an error.

The FFS states that the guidance on the PCB preliminary remediation goals would not be met because containment in a flood plain is not favored as a remedy for PCB contaminated sites. However even if in a flood plain the remedy is not precluded by EPA guidance. Even in a flood plain, guidance is not a legally applicable regulation or statute, it is a guidance document and is to be considered as part of an overall evaluation of alternatives. The referenced preliminary remediation goal is a preliminary number, one that is subject to evaluation after risk assessment and other analysis. The FFS fails to consider the state regulations adopted under Pennsylvania's award-winning Land Recycling Program, which includes pathway elimination as a regulatory option. As a state regulation controlling cleanups in Pennsylvania, it should be considered in selecting a Site remedy.

The proposed treatment system can easily meet both the Ambient Water Quality Criteria for PCBs of 0.014 µg/l and the Maximum Contaminant Level of 0.5 ppb. The Pennsylvania standards are by Aroclor® type as follows in ppb: 1016, 7; 1221, 32, and 42, each 5, 1248, 54 and 60, each 1.

Thirty years of experience with the Site supports the position that the Site is not in the flood plain. It has not flooded. "Major flooding occurred" along the Delaware in 1903, 1936, 1955, 1967, 1972, 1974, and 1996.[55] In 1996, the gaging station on the Delaware River at Trenton recorded the highest flood stage "since the flood caused by Hurricanes Connie and

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Survey data from the Site must be viewed with caution. In attempting to determine the difference between the RI survey referenced to the NGVD 1929 and that of the PDI referenced to the "NGVD 1988," we compared monitor well elevations between the surveys. There should be a constant difference between the two surveys to any series of points. There was not. We found a range of 0.42 feet (ground MW-8) to 3.15 feet (PVC casing, PW-10). The survey points on one or both of the surveys are off.

[55] http://www.ems.psu.edu/PA Climatologist/State/pareg.html

Diane in August 1955."[56] Dating into the 1960s, no one associated with the Site has ever seen flooding or even near flooding at the Site.

Attached to these comments is an opinion from an independent consulting civil engineer confirming that the Site is presently above the 100 year flood and additionally that most of the Site is even presently above the 500 year flood level. [Attachment 1.]

4.3.3.3 Long-term Effectiveness and Permanence.

The secure and treat option provides the same level of effectiveness as the ROD because of the LNAPL collection system,[57] and an additional level of protection afforded by the treatment component. In addition, the incorporation of an HDPE barrier means that this option is the only one of the three with complete containment protecting the Delaware River. LNAPL and contaminants cannot bypass the LNAPL collection system and cannot make their way to the Delaware River under this option since they must pass through treatment and be removed.

The FFS states that "untreated residual waste" "will provide minor risks to human health." This statement is not true. There will be no risks above those posed in the ROD.

Assuming that the Site is in the flood plain, the FFS states that "over the long term, it is likely that flooding...will occur sometime in the future, and preventing the migration of contaminants during flood conditions can not be guaranteed." This statement is incorrect. The Site is not in the flood plain. The Site has never come close to being flooded over the last 30 years of direct observation despite major flood events in the area.[58]

As a final point, the FFS does not explain what precisely would happen during a flood.[59]

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[56] http://water.usgs.gov/wid/FS_103-96/FS_103-96.html

[57] Based upon EPA's rationale.

[58] Delaware River floods occurred in 1972, 1975 and 1996. No releases from the Site were observed during massive rains during a hurricane in 1999 which occurred while conducting the PDI.

[59] The FFS should have scored the dig and haul options down if flooding was expected. The major catastrophic release at the Site would occur if flooding of the Site occurred during the time period between the starting of excavation and the completion of the new cap.

The EPA seems to have developed the opinion that flooding will force PCBs up through the soil. This is 100% contrary to every bit of research that has been conducted over the 30+ years since Soren Jensen raised the alarm about PCB accumulation in the environment. PCBs remain bound to the soil unless there are organic solvents present. A flood event would have to be of months long duration even in order to saturate the soil pores with water, an impossible event at this location on the tidal river. Any LNAPL will trap in the pore spaces and cannot be flushed with water. The surface was flooded during the Owner's remediation in the 1980s for weeks at a time and no additional LNAPL was collected nor did LNAPL or PCBs move to the surface.[60]

Flooding of the Site would actually be a benefit as it would deposit a layer of silt and mud over the Site further sealing it from surface water infiltration. Soils will only be removed if there is a very high flow velocity across the Site. This cannot happen as the flow velocity is highest in the channel and not in the edges of the flood plain. It is in these low velocity margins of the flood plain that sediments are typically deposited. Low velocity areas such as houses and yards always have to have sediment removed after a flood recedes. Further there will be some three feet of clean soils over the Site which would have to be removed by high velocity flood waters before PCB-contaminated soils would be exposed. This fill will also be vegetated which will serve to lower any residual flow velocity.

A report from an independent consulting engineer describes the movement of water across part of the Site if a 500 year flood occurs before the Site is remediated. "...the flow would be shallow and with low velocity...the site is presently adequately protected from the damaging effects of even the 500 year flood..." [Attachment 1.]

The FFS expresses "some concern about the long term reliability of the proposed design..." Since the design is passive and does not depend upon pumps it is completely reliable. CDM has the mistaken opinion that groundwater elevations within the Site will be maintained above high tide levels. This is not true. It will be maintained above low tide levels. Check valves, a common feature of flood walls, are proposed for use. Even if the valves fail, tidal intrusion will be of no consequence as it will be limited to fill areas localized immediately behind the sheet pile wall and all inflow will be treated on its discharge.[61]

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[60] The RI demonstrated a clean surface.

[61] This issue was explained in a letter to L. Dietz, U. S. EPA, Region III dated 11 May 2000. It may be that CDM did not receive our information before finalizing the FFS. In any event, the letter and its information is made part of these comments.

4.3.3.4 Reduction of Toxicity, Mobility or Volume Through Treatment.

The dig and haul plans do not provide greater protection for groundwater than the secure and treat plan. This point has been discussed in Section 4.3.2.4.

4.3.3.5 Short-term Effectiveness.

The FFS correctly identifies the advantages associated with the secure and treat plan:

a.) Eliminates contaminant releases during excavation, handling, and transport of PCBs.

b.) Eliminates the risk of truck accidents during off-site hauling of wastes.

c.) Does not require the handling of decontamination liquids and materials.

Another factor to consider is the time frame needed to implement remediation. Under the secure and treat plan, sediment remediation can commence immediately upon completion of the sheet pile wall and the turbidity curtains. Under the dig and haul options, sediment remediation is delayed until excavation is well underway. While projected to be only a matter of months, this delay will only increase if difficulties are encountered and the amount of excavation required grows.

4.3.3.6 Implementability.

The FFS correctly identifies the advantages associated with the secure and treat plan:

a.) The HDPE membrane is easy to install.

b.) The HDPE membrane is easily visually inspected to prevent installation flaws.

c.) The composite wall system will serve as an effective and reliable oil recovery system.

d.) The traffic coordination and scheduling of a large number of trucks hauling waste material over busy roads is not required.

e.) Restrictions to protect St. Vincent's School are not needed.

f.) Access roads and areas for excavation vehicles, along with soil staging areas[62], will be minimized.

The one issue raised in the FFS concerned the ease of monitoring the carbon treatment component for effectiveness due to its location below ground. The carbon units will be located in easily accessible manholes in modular, cannister form. They can be quickly lifted to the surface and inspected. Replacement is a matter of minutes. Sampling after the carbon will determine the effectiveness of the carbon.[63]

4.3.3.7 Cost.

The secure and treatment option, projected to cost a little less than $8 million for all items, has the lowest overall cost of the three plans evaluated. It is the only plan that includes treatment. It is the plan that releases the lowest amount of PCBs to the environment, over the short and long term. It is the plan that has the least amount of potential cost growth because it avoids the pitfalls and uncertainties associated with the excavation option of the ROD, and the over-excavation to remove LNAPL issues of the PRP Group's plan. For Southern Area remedial activities, the secure and treat option is estimated to cost approximately $6.2 million.

Table 4.1 Critique of FFS Feasibility Criteria.

Alternative	1. Overall Protection of Human Health and the Environment	2 Compliance with ARARs	3. Long-term Effectiveness and Permanence	4. Reduction of Toxicity, Mobility or Volume through Treatment
EPA's ROD Plan Dig and haul. LNAPL containment & collection. No groundwater treatment.	Critique: No treatment of groundwater contaminants including PCBs, VOCs, SVOCs, metals. Highest amount of PCBs released during remedy. Uses open trenches for LNAPL recovery.		Critique: LNAPL collection system is not fail safe and can leave oil on site after the trenches are closed.	Critique: No treatment.
Site Owner's Plan PCB containment in-	Critique: Containment and treatment system has the lowest amount of	Critique: The site is not now within the current 100-year flood plain. A	Critique: The containment system has the same level of	Critique: This option is the only one that includes any treatment at

[62] Only clean cover soils will be staged.

[63] The secure and treat design is the only plan allowing sampling from a discharge point location. The other two plans do not have this capability and must collect samples from monitoring wells.

Alternative	1. Overall Protection of Human Health and the Environment	2 Compliance with ARARs	3. Long-term Effectiveness and Permanence	4. Reduction of Toxicity, Mobility or Volume through Treatment
place. LNAPL containment & collection. Groundwater treatment	post-remediation releases of PCBs to the environment of the three alternatives. Lowest overall amount of PCBs released	2-foot cap will be added. Compliant with all ARARs. Acceptable under Pennsylvania Act 2.	effectiveness as the LNAPL containment system of the ROD.	all.
PRP Group's Plan Dig and haul. No LNAPL containment & collection. No groundwater treatment.	Critique: The ability of excavation to remove residual oil, defined as a sheen, is uncertain at best.		Critique: If monitoring identifies need for additional measures for LNAPL removal after excavation, releases will have been ongoing and will continue until remedy is further designed and implemented.	Critique: This option has the same level of treatment as the ROD. Therefore, the FFS evaluation of these criteria for the ROD is used.

Alternative	5. Short-term Effectiveness	6. Implementability	7. Cost	8. Ranking
EPA's ROD Plan Dig and haul. LNAPL containment & collection. No groundwater treatment.	Critique: Short-term risks to workers, nearby residents, and communities in Pennsylvania and New York. Numerous potential pathways for releases during remediation, transportation and disposal. Dependence on engineering controls, which are not perfect. A significant chance of a truck accident during off-site transport.	Critique: The difficulty with safely implementing the dig and haul option has been underestimated. There are numerous potential failure mechanisms associated with excavation, staging, and off-site transport. Concede difficulties with sheet pile close to the site bank near the rip-rap but it will not be placed through rip rap but at the toe of the slope.	Critique: Current estimate of sheet pile wall is approximately $3.32 million for 1,200 linear feet. PRP Group estimates all upland excavation and disposal is $2,251,719 (Item I). Owner estimates sediment removal & restoration = $874,000. Revised cost = $12.9 million	
Site Owner's Plan PCB containment in-place. LNAPL containment & collection. Groundwater treatment	Critique: Most effective of the plans.	Critique: Most easily implemented of the plans.	Critique: Used Site Owner's estimate for all items. Added public education program costs from FFS Appendix B. Revised total cost = $7.9 million.	
PRP Group's Plan Dig and haul. No LNAPL containment & collection.	Critique: Highest amount of short-term releases of PCBs with risks to workers, nearby residents, and communities in	Critique: Difficult to safely implement the dig and haul option. Added difficulty associated with trying to remove LNAPL by excavation.	Critique: Adjusted sheet pile wall costs by assuming shortened wall will be one-third the length of the bank. Owner estimates $3.32	

Alternative	5. Short-term Effectiveness	6. Implementability	7. Cost	8. Ranking
No groundwater treatment.	Pennsylvania and New York. Numerous potential pathways for releases during remediation. Dependence on imperfect engineering controls. Statistics indicate around 1 in 4 chance of a truck accident during off-site transport	There are numerous potential failure mechanisms associated with excavation, staging and off-site transport. Concede difficulties with sheet pile close to the site bank near the rip-rap.	million for 1,200 linear feet, or $1.14 million for 400 feet. Also FFS cost sheet apparently excluded costs for sediment removal and restoration. Added Owner's estimate of $874,500. Revised estimate is $10.6 million.	

Table 4.2 Feasibility Criteria Scoring Comparison: FFS and Site Owner's Comments.

Alternative	1. Overall Protection of Human Health and the Environment	2 Compliance with ARARs	3. Long-term Effectiveness and Permanence	4. Reduction of Toxicity, Mobility or Volume through Treatment
EPA's ROD Plan	*FFS: High = 5*[a] **Comments: Medium = 3**[b]	*FFS: High = 5* **Comments: High = 5**	*FFS: Medium to High = 4* **Comments: Medium to High = 4**	*FFS: Low to Medium = 2* **Comments: Low to Medium = 2**
Site Owner's Plan	*FFS: Medium = 3* **Comments: High = 5**	*FFS: Medium = 3* **Comments: High = 5**	*FFS: Medium = 3* **Comments: Medium to High = 4**	*FFS: Medium to High = 4* **Comments: Medium to High = 4**
PRP Group's Plan	*FFS: Medium to High = 4* **Comments: Medium = 3**	*FFS: High = 5* **Comments: High = 5**	*FFS: Medium to High = 4* **Comments: Medium = 3**	*FFS: Medium to High = 4* **Comments: Low to Medium = 2**

Alternative	5. Short-term Effectiveness	6. Implementability	7. Cost	8. Ranking
EPA's ROD Plan	*FFS: Medium to High = 4* **Comments: Low to Medium = 2**	*FFS: Medium to High = 4* **Comments: Low to Medium = 2**	*FFS: Lowest = 1 (highest cost)* **Comments: Lowest = 1**	Σ Score FFS = 25 Σ Revised Score = 19
Site Owner's Plan	*FFS: High = 5*	*FFS: High = 5*	FFS: = 5 (Lowest cost)	Σ Score FFS = 28

Alternative	5. Short-term Effectiveness	6. Implementability	7. Cost	8. Ranking
	Comments: High = 5	**Comments: High = 5**	**Comments: High = 5**	Σ Revised Score = 33[c]
PRP Group's Plan	*FFS: Medium to High = 4* **Comments: Low to Medium = 2**	*FFS: Medium to High = 4* **Comments: Low to Medium = 2**	FFS: Medium to High = 4 **Comments: Medium = 3**	Σ Score FFS = 29 Σ Revised score = 20

Table 4.2 Notes.

a. The numerical rankings were developed by assigning values to CDM's ratings of low, medium and high. CDM's FFS rankings have not been changed.

b. These ratings are based upon the Site Owner's critique of CDM's statements and use the same low to high scale adopted by CDM.

c. The highest score indicates the best remedy based upon an equal weighing of all Superfund Threshold and Primary Balancing Criteria.

Table 4.3 Revised Capital Costs for the Dig & Haul and the Secure & Treat Remedial Options.

Table 4.3.1 Revised Capital Costs for the EPA's ROD Dig and Haul Option.

Component	**Capital Cost**	**Source**
Deed Restrictions	0	Grajczak Item 10. Reference 8.2 Tab 3
Access Restrictions	0	Grajczak Item 10
Warning Signs	0	Grajczak Item 10
Public Education Program	35,000	FFS App. B AR304200
Excavate Courtyard and Dispose	270,400	Grajczak Item 1
Remove & Dispose of UST	68,400	Grajczak Item 8.0
Containment System	3,316,000	Grajczak Item 3.0 Less HDPE Costs + Item 4
Excavate Sediments, Restore Mud Flats	874,420	Grajczak Item 6.0
Excavate and Dispose of All Upland Materials	2,251,719	Included in Upland Materials Costs, FFS App. B, Table 2, Line 1
Replacement of Soil	0	Included in Upland Materials Costs FFS App. B Table 2 Line 1
Soil Cover Addition	507,150	Grajczak Item 9
Incidental Soil Handling	667,000	FFS Appendix B, AR304200, Misc. Soil Cleanup from Spills, Roads, etc.
Site Closure	119,000	Grajczak Item 10
Subtotal	**8,109,089**	
Engineering at 10%	810,909	
Contingency at 15%	1,216,363	
Total Capital Cost	**10,136,361**	
Plus Present Worth of O & M	2,773,942	
Total Present Net Worth Cost	**12,910,303**	
For Southern Area Only:		
Subtotal	**4,758,089**	
Engineering at 10%	475,809	
Contingency at 15%	713,713	
Total Capital Cost	**5,947,611**	
Plus present worth of O&M	2,773,942	
Total Present Net Worth Cost	**8,721,553**	

Table 4.3.2. Revised Capital Costs for the PRP Group's Dig and Haul Option.

Component	Capital Cost	Source
Deed Restrictions	0	Grajczak Item 10
Access Restrictions	0	Grajczak Item 10
Warning Signs	0	Grajczak Item 10
Public Education Program	35,000	FFS Appendix B AR304200
Excavate Courtyard and Dispose	270,400	Grajczak Item 1
Remove & Dispose of UST	68,400	Grajczak Item 8.0
Containment System	1,143,080	One-third of Grajczak Item 3.0 Less HDPE Costs + 7
Excavate Sediments, Restore Mud Flats	874,420	Grajczak Item 6.0
Excavate, Dispose of Upland Materials	2,567,073	Included in Upland Materials Costs, FFS Appendix B, Table 2, Line I
Replacement of Soil	0	Included in Upland Materials Costs, FFS Appendix B, Table 2, Line I
Soil Cover Addition	507,150	Grajczak Item 9
Incidental Soil Handling	667,000	FFS Appendix B AR304200 for Misc. Soil Cleanup from Spills, Roads, etc.
Site Closure	119,000	Grajczak Item 10
Subtotal	**6,251,523**	
Engineering at 10%	625,152	
Contingency at 15%	937,728	
Total Capital Cost	**7,814,404**	
Plus Present Worth of O& M	2,773,942	FFS Appendix B, ROD O & M - Without LNAPL Containment More Monitoring.
Total Present Net Worth Cost	**10,588,346**	
For Southern Area Only:		
Subtotal	**5,071,703**	
Engineering at 10%	507,170	
Contingency at 15%	760,755	
Total Capital Cost	**6,339,629**	
Plus Present Worth of O & M	2,773,942	FFS Appendix B, ROD O & M - Without LNAPL Containment More Monitoring
Total Present Net Worth Cost	**9,113,571**	

Table 4.3.3. Revised Capital Costs for the Site Owner's Secure and Treat Option.

Component	Capital Cost	Source
Deed Restrictions	0	Grajczak Item 10
Access Restrictions	0	Grajczak Item 10
Warning Signs	0	Grajczak Item 10
Public Education Program	35,000	FFS Appendix B AR304200
Excavate Courtyard and Dispose	270,400	Grajczak Item 1
Remove & Dispose of UST	68,400	Grajczak Item 8.0
Containment System	3,362,000	Grajczak Item 3.0 & 7
LNAPL Collection System	166,000	Grajczak Item 4.0
Water Treatment System	72,000	Grajczak Item 5
Excavate Sediments, Restore Mud Flats	874,420	Grajczak Item 6.0
Excavate, Dispose of Upland Materials	0	
Replacement of Soil	0	
Soil Cover Addition	507,150	Grajczak Item 9
Incidental Soil Handling	62,000	Grajczak Items 2.1, 2.2, 2.3
Site Closure	119,000	Grajczak Item 10
Subtotal	**5,536,370**	
Engineering at 10%	553,637	
Contingency at 15%	830,456	
Total Capital Cost	**6,920,462**	
Plus Present Worth of O & M	1,011,690	Grajczak Estimate
Total Present Net Worth Cost	**7,932,152**	
For Southern Area Only:		
Subtotal	**4,169,150**	
Engineering at 10%	416,915	
Contingency at 15%	625,372	
Total Capital Cost	**5,211,438**	
Plus Present Worth of O & M	1,011,690	
Total Present Net Worth Cost	**6,223,128**	

5.0 Comparison of Numbers of Accidents, Injuries and Deaths During Remediation.

5.1 Introduction.

The dig and haul options are significantly more expensive than the Site Owner's secure and treat proposal. While not a one-for-one relationship, the additional dollars spent on digging and hauling results in higher potentials for accidental injury and death on the part of Site workers. Because there is to be trucking off-site, primarily for the dig and haul plans, there will also be an increased risk of truck accidents with their injuries, deaths, and potential environmental releases of PCBs.

The increased risks of the dig and haul options as compared to the secure and treat option can be calculated based upon standard published statistics. Since we are making a comparative analysis, we have limited the analysis to man-hours and operations involved in excavating and sending PCB contaminated material off-site. We have also made simplifying assumptions as time does not allow for more detailed calculations. The calculated risks should be considered to be in the ballpark but not exact.

5.2 Accident Risk Model Parameters.

The nonfatal occupational injuries and illnesses for 1998 are 9.1 per 100 employees per year (200,000 hours) in the special trades contractor category.[64] The corresponding rate for trucking and warehousing is 8.4. Estimates of personnel employed to move dirt around the site from excavation to truck loading and backfill are relatively easy. The hours employed in trucking material off-site and back to the Site are made with a number of assumptions. These include the split of materials going to various off-site disposal facilities and the location of the needed backfill as well as the total amount of material to be moved.

Fatality calculations can also be made and compared with EPA's policy regarding the meaning of risk assessment calculations. Risks equal to or greater than 1.0E-06, one in one million, do not require remediation. Risks of between 1.0E-04 and 1.0E-05 are in an acceptable range and may not require remediation, while those greater[65] than this require remediation.

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[64] http://stats.bls.gov/oshhome.htm

[65] Note that 1.0E-03 is greater than 1.0E-04, 0.001 > 0.0001 and 1.1E-04 is greater than 1.0E-04, 0.0011 . 0.0010. Greater translates into more certain with one having the meaning that the effect will occur.

Tables 5.1 and 5.2 summarize the assumptions and calculations.

5.3 Summary.

An examination of the results of the accident calculations demonstrates that comparatively there is a 50% to 90% chance of an accident or illness due solely to the use of dig and haul remediation. This risk does not exist with the secure and treat plan. Of course, the absolute or total risk of dig and haul options are much higher than these. It can be stated that implementation of the dig and haul option will certainly cause a worker injury of unknown magnitude.

The relative death risk for the dig and haul option is of course much lower than the accident rate. However, it is still significant.[66] The rate peaks at 1 in 2,500. This puts it well into the EPA unacceptable range which requires remediation. In Section 6 of these comments we place this risk in the context of EPA's calculated risks for the Site.

The magnitude of the dig and haul enterprise contemplated at the Metal Bank of America Superfund Site will create the need for 870 to 1,700 large, over-the-road 80,000 pound tractor-trailer trucks to pass next to the St. Vincent's School. Half of these trucks will be carrying PCB-contaminated wastes. This is not the total number of trucks required for the dig and haul remediation. This is the excess number of trucks required over and above those required by the secure and treat plan of the Site Owner.

[66] A one in a million death rate risk is considered acceptable by everyone but the one.

Table 5.1 Excess Injuries and Deaths Due to Haul and Dispose Remediation.

Occupation	Injury & Illness Rate[67]	Fatality Rate[68]	Site Related Work Hours[69]	Number of Site Related Injuries	Number of Site Related Deaths[70]
Special Trade Contractor	9.1	227	4,800[71]	0.22	1.5E-04
			8,000[72]	0.36	5.2E-04
Trucking	8.4	562	6,400	0.27	1.0E-03
			12,500	0.53	2.0E-03
Total				0.49	1.2E-03
				0.89	2.5E-03

67 Per 200,000 hours worked in 1998.

68 Number of job fatalities in 1998.

69 Excavation of 10,000 and 20,000 cubic yards.

70 Based upon total years worked in the industry in 1998: 3,751,000 and 1,739,000 respectively.

71 Under the 10,000 cubic yard excavation scenario of the plans of EPA and the PRP Group.

72 Under the 20,000 cubic yard excavation scenario of the plans of EPA and the PRP Group.

Table 5.2 Estimated Number of Large Truck Visits to the Site Due to Implementation of the Dig and Haul Remedial Plans.

Repetitive Task	Excavate 10,000 yd^3		Excavate 20,000 yd^3	
Return to Excavation.[73]	1,500 yd^3		3,000 yd^3	
Ship to PCB Landfill.	4,250 yd^3		8,500 yd^3	
Ship to Residual Landfill.	4,250 yd^3		8,500 yd^3	
Backfill to Site.[74]	8,500 yd^3		17,000 yd^3	
Round Trip to PCB Landfill.	840 mi.[75]	19 hr.[76]	840 mi.	19 hr.
Round Trip to Residual Landfill.[77]	120 mi.	5 hr.	120 mi.	5 hr.
Round Trip to Backfill Source.	60 mi.	2.5 hr.[78]	60 mi.	2.5 hr.
Number of Trips to PCB Landfill.[79]	220		430	
Number of Trips to Residual Landfill.	220		430	
Number of Trips to Backfill Source.	430		850	

[73] Use Ogden's estimate of 15% return to excavation and 50% of remainder to each type of landfill.

[74] Assume site for backfill at half the distance of the residual landfill. Assume even if sediments are placed in excavation that area behind sheet pile wall will need to be backfilled.

[75] To Model Cities, New York.

[76] All loads include one hour for loading and one hour for unloading including decontamination, paperwork, sampling, etc. Travel to Model Cities is estimated to be at 50 mph and that to GROWS Landfill to be at 40 mph.

[77] To GROWS Landfill.

[78] Used one hour for loading and unloading combined.

[79] Assume all loads are 40,000 lb. Assume all material weighs out at 2,000 lb. per cubic yard. Actually the material probably weighs out at greater than 3,000 lb. per cubic yard which means a 50% increase in truck traffic if this factor is used.

Repetitive Task	Excavate 10,000 yd^3	Excavate 20,000 yd^3
Total Number of Trucking Hours.	6,400 hr.	12,500 hr.
Total Number of Excess Large Truck Trips to the Site Due to Implementation of EPA's ROD Plan.[80]	870[81]	1,700

[80] This is a comparative number of trips and <u>is not</u> the total number of large truck trips to the Site during remediation. That number will be higher under the dig and haul plans and much smaller under the secure and treat plan.

[81] Could be 50% low. See previous discussion of the use of 2,000 pounds per cubic yard conversion factor rather than the more probable 3,000 pounds per cubic yard.

6

6.0 EPA's Risk Assessment Compared to During and Post-Remedial Conditions.

In reaching its ROD, EPA has necessarily determined that the Site in its present condition requires remediation. Thus, a proper comparison of the three remedial plans under the FFS must determine which of the plans best addresses the risks determined by EPA to have driven its ROD. Table 6.1 incorporates a table in the ROD[82] in which EPA summarizes its risk assessment. An examination of either of these tables shows that there is only one risk that requires remediation, the construction worker exposed to LNAPL.[83]

All three of the remedial plans lower EPA's risk to acceptable levels by exposing remediation construction workers to PCB-containing oils. Protective equipment will be required when dealing with oils on the Site to control this risk. Obviously this risk for the Site in its present condition is best controlled, all other factors not considered, by a deed restriction requiring future construction workers to wear protective clothing and not by massive site remediation.

There are no other risks that must be addressed during remediation based upon the table in the ROD. After implementation, the three remedial plans, all further lower the risks driving the ROD even though none are at unacceptable levels.

The implementation of the dig and haul remedial plans versus the secure and treat plan can be seen to give rise to a higher risk to construction workers than is originally found by EPA to be presented by the Site in its present condition. (See Tables 5.1 and 6.1.) Unlike the ROD perceived risk, there is no way to protect against this risk and lower it.

An analysis of some of the other risks generated by the implementation of dig and haul remediation shows that students at St. Vincent's School are exposed to PCBs. While the calculated risks are relatively low, due to the press of time we have not calculated the risks from all of the possible sources of PCB emissions during dig and haul remediation. (See Section 3 of these comments.)

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[82] One exposure scenario, the on-site industrial worker, is left off of Table 6.2.

[83] The Site Owner continues to challenge the validity of EPA's risk assessment but assumes their viability only for the purposes of this comparison.

Table 6.1. Site Risks: Pre-, During and Post-Remediation.[a]

Exposure Pathway	Off-Site Resident	Construction Worker	Recreational Boater		Remedial Status
			Adult	Child	
Ambient Air Inhalation	2.02E-06	1.63E-06			Before[b]
	3.3E-08[b]				During
					After
Soil Ingestion		9.42E-06			Before
					During
					After
Dermal Contact with Groundwater		6.37E-06			Before
					During
					After
Dermal Contact with LNAPL		1.56E-03			Before
					During
					After
Surface Water Ingestion			1.20E-10	5.97E-10	Before
					During
					After
Dermal Contact with Surface Water			3.41E-07	1.59E-07	Before
					During
					After
Sediment Ingestion			3.17E-06	7.24E-06	Before
					During
			0	0[g]	After
Fish Ingestion			6.79E-05	3.96E-05	Before
			Will Increase.	Will Increase.	During
			6.79E-05[c]	3.96E-05[c]	After

Dig and Haul Remediation	Much greater than 2.0E-03.[e,f]	8.9E-01[d] 2.5E-03[e]			During
					After

Table 6.1. Notes.

a. Table is based upon "Table 10: Summary of Human Health Cancer Risks" found in EPA's ROD at page 31. On-site industrial worker scenarios have been eliminated from this table since EPA calculated them at the 0.00001 level pre-remediation and they will be reduced to the 0.000001 level by EPA's calculations. While we have disputed EPA's risk evaluations, their pre-remediation numbers are accepted for the purposes of this analysis.

b. All "Before Remediation" numbers taken from EPA's final risk assessment, the results of which are shown in the ROD. Open boxes represent exposure pathways that EPA considers "not applicable." Note that the only risk requiring remediation is EPA's construction worker scenario which can easily be handled by a deed restriction.

c. Risk will stay the same after secure and treat remediation as sources of PCBs in fish in the Delaware River are sources other than the Site. Risk levels may increase slightly during and after dig and haul remediation due to the consequent release of PCBs into the environment.

d. Injury and illness rate indicating that there is a 90% chance of someone getting an exposure related illness or being injured during dig and haul remediation. This is not an absolute rate but is the additional rate over implementing the secure and treat remedial option. See Table 5.1. Includes trucking.

e. Fatality rate indicating that there is a better than one in a thousand chance of someone getting an exposure related illness or being injured during dig and haul remediation. This is not an absolute rate but is the additional rate over implementing the secure and treat remedial option. See Table 5.1. Includes trucking.

f. Note that death rate is for workers participating in remediation. As such it does not reflect the fact that fatalities per truck drive fatality are higher since truck accidents can cause fatalities but have the truck driver live, no fatality under worker statistics. A truck driver fatality can also involve other fatalities.

Inhalation risks for students at St. Vincent's School from the digging and hauling on-site are calculated under "Ambient Air Inhalation."

g. Sediments will be secured on-site with all plans. Present contact with non-riprap associated sediments should have a much reduced risk due to the general decrease in PCB levels in sediments at the Site.

h. See Table 6.2. Noncarcinogenic Risk = 0.1

Table 6.2 Ambient Air Concentrations at St. Vincent's School[a] and Associated Risks. ($\mu g/m^3$ of PM-30)

10,000 Cubic Yard Dig and Haul Scenario[b]								
Time Period	Meteorological Data Period Used: April to May					All Years		
	1989	1990	1991	1992	1993	Maxium um	Minimum	Average
Maximum 1 hour average.	637	1,229	1,146	971	1,499	1,499	637	1,097
Maximum 8 hour average.	273	364	211	252	637	637	211	347
Period daytime[c] average.	29.6	36.9	29.3	36.1	35.3	36.9	29.3	33.5
20,000 Cubic Yard Dig and Haul Scenario[b]								
Time Period	Meteorological Data Period Used: April to May					All Years		
	1989	1990	1991	1992	1993	Maxium um	Minimum	Average
Maximum 1 hour average.	1,457	1,229	1,146	1,055	1,499	1,499	1,055	1,277
Maximum 8 hour average.	396	364	211	252	637	637	211	372
Period daytime[c] average.	37	29.9	26.8	28.8	31.9	37.3	26.8	31.0
PCB Ambient Air Screening Levels ($\mu g/m^3$)								
ExposureTime	1 Hour	8 Hour	8 Weeks	16 Weeks	1 Year	16 Week Maximum PCB Exposure		
Carcinogenic Risk[d] at 1E-06	153.6	19.2	0.48	0.24	0.074			
Noncarcinogenic Risk[e]	48	6.0	0.15	0.075	0.023	8E-03		

Table 6.2 Notes.

a. Used playground next to Cottman Street as receptor point.

b. Only emissions from on-site digging, transportation and loading considered. Other on-site and off-site sources not reflected in these numbers.

c. 0900 to 1600 hours.

d. Body Weight: 15 kg; Averaging Time: 25,550 days per lifetime; Exposure Frequency: 5 days per week; Inhalation Rate: 10 cubic meters per day; CSF Inhalation: 2 $(mg/kg/day)^{-1}$.

e. RfD Inhalation: 7E-05 mg/kg/day. Target Hazard Quotient = 1.

7.0 Summary and Conclusions.

These Comments assume that remediation is necessary and appropriate for the Cottman Avenue Site. A review of CDM's FFS demonstrates that serious doubts about the validity of this threshold assumption on the necessity for and propriety of the ROD remedy or any other alternative remedial action have not been resolved. Indeed, the results of this careful review of the FFS reinforce the conclusion that additional or further remediation following the work accomplished by the Site Owner in the 1980s is contraindicated.

Review of the response alternatives evaluated in the FFS disclose that there are significant risks involved in carrying out any of the remediation plans, when measured against the minimal risk which exists with the Site in its present state. This leads inevitably to the conclusion that a "limited-only action" remedy remains the most appropriate for this Site at this time. Obviously, what that means is securing the Site by appropriate methods such as additional engineering controls and a strong deed restriction prohibiting excavation except if undertaken with the special precautions required by the presence of contaminants in the underlying soils.[84]

Since "limited-only action" appears not to be possible at this time given the existing EPA administrative mind set, if additional remediation is required then it should be such that it does the least damage to the environment, with the least human health risk from all possible consequences.

Of the three alternatives presently under consideration, objective review and analysis demonstrates that the Site Owner's Proposed Plan of securing and treating comes closest to achieving the stated goals established by EPA in the ROD. At the same time, the Site Owner's plan can be undertaken at the least cost, with little added risk to health, welfare and the environment. The result will be a site which may ultimately be suitable for a number of beneficial uses which may be complementary to or more consistent with the neighboring St. Vincent's School and Day Care Center. The combination of containment and on-site treatment, prevention of releases to the environment, increased overall safety and reduced cost all support the Site Owner's Plan as the best alternative under consideration.

At least the following conclusions can be drawn from our evaluation of the FFS and the three alternatives under consideration, which are fully supported by these comments prepared within the limited time afforded by the Agency to complete this difficult task:

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[84] EPA's ROD assumes that construction workers can safely excavate at the Site. Therefore protecting any future construction worker is a simple matter of a deed notice.

a. The dig and haul proposals included in the ROD and the PRP Group's Plan both require large amounts of earth handling and movement on and off site.

b. The disturbances of the soils will necessarily involve releases of PCBs to the environment, with potentially adverse consequences to youngsters, parents, workers and friends at St. Vincent's School, as well as to the Delaware River and areas around the Site.

c In addition, the work will be performed for little or no actual benefit to the environment, since the ultimate reduction of releases of PCBs assumed to result at the Site from digging and hauling, will be far exceeded by the releases, near and long term, involved in the excavation and transportation of the contaminated soils and assumed LNAPL.

d. Under present conditions of the Site, there are no releases of measurable quantities of PCBs because the contaminated soils are below the clean surface, and immobile. There is virtually no release or potential release of PCBs in groundwater, or in a separate oil phase since all of the floatable and movable oil was removed in the 1980s.

e. Site Owner's plan provides a virtually fail-safe method for preventing the perceived possibility that there may be a release of PCBs because of the assumed presence of LNAPL and the presence of contaminated soils by providing for HDPE/sheet pile containment, coupled with a passive groundwater collection and treatment system. This is achieved without the near certain release of contaminants associated with excavation, moving, handling and transportation associated with the dig and haul options, and the near certainty that there will be injuries and possibly death associated with the work related to such activities.

f. The stated concerns related to the proximity of the Delaware River are misplaced or greatly exaggerated. The fact is that the Site is above both the 100-year and 500-year flood lines, not even considering the addition of two feet of vegetated soil contemplated by all remedies. This combined with the properties of PCBs in soils and in oil which cause immobilization of residual contamination at the Site, make it clear that there is no reasonable basis for assuming a flood-related risk of release of PCBs to the environment from the Site.

g. The Site Owner's plan has been demonstrated to be far superior to the other plans under consideration because it results in virtually no measurable releases of PCBs to the environment, and meets the requirements of the ROD and all of the ARARs, policies and guidelines for remediation at less cost.

The Site Owner's Comments to EPA's Proposed Plan calculated PCB emissions pre- and post-proposed remediation for the groundwater to surface water release pathway. Until the preparation of these comments, there has not been an attempt to calculate the risks posed by and the damage done by the proposed remedial actions at the Site. These comments on the FFS do not try to fully quantify the environmental costs of a proposed remedial plan for the Site and balance it against the environmental benefits of the action. Instead they simply demonstrate that the releases to the environment as a necessary condition of implementing a particular plan, dig and haul, are significantly in excess of those associated with the Site Owner's secure and treat proposal, and that the risk of remediation exceeds the risks posed by the site contamination itself.

Given the comparative safety of the Site Owner's plan, it is inappropriate to undertake any other plan unless it can be demonstrated as achieving the goals of remediation at less human and environmental costs. Assuming that remediation is, in fact, required, there is no other plan presented that can achieve such goals. Consequently, only the Site Owner's plan should be considered. It will be far less costly. It will minimize the risks of injury or death to workers involved in the remediation; it will minimize the risk of injuries to the traveling public; it will virtually eliminate the risk to residents, workers, students and parents traveling to and from St. Vincent's school; it will result in virtually no releases of PCBs to the environment (none of the releases from excavation, transportation, etc. will occur except to the extent unavoidable related to the Courtyard area where PCB levels and quantities are low), and will meet all of the applicable and relevant or appropriate standards and other criteria related to such work. Moreover, off-site disposal of contaminants for potential uncontrolled further release into the environment will be eliminated.

Based upon the results of this comparative study, additional adjustments may be considered by the Agency. For example, it may want to rethink the excavation of the Courtyard area, and the excavation of sediments in the mud flats and river. If these parts of the plan were eliminated, virtually 100 % of total PCB releases anticipated from remedial activities will be eliminated. Relatively higher levels of PCBs in sediments along the rip rap and near shore would be captured without dredging and consequent partial release by the installation of just the sheet pile/HDPE wall. The potential pathway of exposure through release of source materials to groundwater or as LNAPL will be completely eliminated through containment and through collection and treatment of groundwater before discharge to the Delaware River.

With regard to the "dig and haul" component of the EPA's and PRP Group's plans, this review and these comments demonstrate that: (a) the release of PCBs will occur; (b) there will be measurable exposure to students and visitors at the School and Day Care Center located across the street from the Site; (c) these releases do represent some degree of increased risk, albeit within the parameters of that which may be considered as acceptable (unless you are the parent of a child attending St. Vincent's School); (d) the added but unquantified risk of other chemicals such as PAHs being released which, so long as there is no other release appears to pose no problem; (e) this risk is additive to the risk represented by other activities at the Site (e.g., that a person may be involved in an accident with one of the many construction vehicles that will be traveling to and from the Site); (f) there are risks that persons may trespass on the Site (attractive nuisance concept - youngsters are known to be attracted to construction sites, risk of falling into excavation even if guarded, risk of playing on or with vehicles, etc. even if security personnel are present and available, etc.); and (g) there is a risk of all of the other Murphy's Law things which can go wrong with this type of operation next to an active school and which may cause injury or death to innocent victims or bystanders.

When all of the other risks are added in, these comments demonstrate a very strong case for the Site Owner's Plan as opposed to the dig and haul plans because it will eliminate virtually all of the remediation-related community risks, except for those which accompany the risk related to the installation of the sheet pile wall and its accompanying HDPE liner and the collection and treatment system (which is a constant for each of the alternatives under consideration). These significant risks suggest that the no action option is the best alternative at this site. Moreover, the documented releases to the environment at present are so infinitesimally small, that this fact alone supports the conclusion that the very best alternative is to use engineering controls rather than construction.

It is only because EPA is adamantly opposed to such a sensible approach that the Owner's Group has proposed the secure and treat option as the best alternative to the plans offered by EPA under the ROD and by the PRP Group.

8

8.0 References.

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8.2 Kleppinger, E. W., et al.: "A Proposed Remedial Plan, Metal Bank of America Superfund Site," January 14, 2000.

8.3 Environmental Protection Agency: "Record of Decision, Metal Bank Superfund Site, Philadelphia, Pennsylvania", December 1997.

8.4 Ogden Environmental and Energy Services Co., Inc., et al.: "Preliminary Design Report," Prepared for the Cottman Avenue PRP Group Respondents; March 6, 2000, and as variously amended through May 1, 2000.

8.5 Environmental Protection Agency: "Superfund Program Proposed Plan, Metal Bank Superfund Site," July 1995.

8.6 Dietz, Linda, Remedial Project Manager, Environmental Protection Agency, Region III, Letter to Edward W, Kleppinger, EWK Consultants, October 18, 1999.

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8.8 Kleppinger, Edward W., EWK Consultants, Inc.: Letter Report to John Mattioni, Mattioni, Mattioni and Mattioni, Ltd., October 18, 1995, including Brown, Kirk, Principal Consultant, K.W. Brown Environmental Services, Letter Report to Edward W. Kleppinger, EWK Consultants Inc.; October 17, 1995. [Submitted by J. Mattioni to Cesar Lee, Remedial Project Manager, EPA as Supplemental Comments for the Administrative Record on 18 October 1995.]

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ATTACHMENTS

LEONARD J. STRANDBERG AND ASSOCIATES,
Consulting Engineers and Land Surveyors, P.C.

ATTACHMENT 1

June 23, 2000

Edward W. Kleppinger, Ph.D.
EWK Consultants, Inc.
2454 Royal Street
New Orleans. LA 70117

Re: ***Report of Flood Investigation Study***
in connection with the Cottman Avenue Industrial Site
on the Delaware River, Philadelphia, PA

Dear Dr. Kleppinger:

Pursuant to the request of Mattioni, Ltd., we investigated the flood potential of the referenced site with respect to the flood elevations published in the "Flood Insurance Study, City of Philadelphia, Pennsylvania", revised August 2, 1996. In this report, the flood elevations for the Delaware River are presented in Table 3 "Summary of Stillwater Elevations", on page 16. All flood elevations are given in the National Geodetic Vertical Datum of 1929. The site is located on the west bank of the Delaware River approximately a mile upstream of the Tacony Palmyra Bridge, and approximately midway between Frankford Creek and Pennypack Creek. The flood elevations of the Delaware River are indicated below, with the interpolated elevations at the Cottman Avenue Site indicated in italics.

Flooding Location	10-Year	50-Year	100-Year	500-Year
Frankford Creek	7.8	9.3	10.1	12.3
Cottman Avenue Site	*7.9*	*9.5*	*10.2*	*12.5*
Pennypack Creek	8.0	9.6	10.3	12.6

Existing Topographic Conditions:

On June 22, 2000, a site walkover was conducted to review the existing topographic conditions at the site and its immediate adjacent properties. The topographic map prepared by American Geotech, Inc.,

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was used to evaluate the site relative to the published flood levels for the Delaware River. The site extends from Milnor Street at the north along an extension of Cottman Avenue to the Delaware River. The northern area forms a narrow panhandle shape where the foundations of several industrial buildings and one large frame building still remain. The southern area presently consists of a grassy plain in which two deer were observed during this walk through. Adjacent properties to the north and east are active industrial sites, involved in breaking down appliances such as refrigerators and reclaiming scrap metal. The site to the west is the Saint Vincent De Paul School, with a kids playground near Milnor Street and a neatly mowed lawn fronting the Delaware River waterfront. A municipal combined sewer outfall discharges into the Delaware River at the terminus of Cottman Avenue about halfway along the west boundary of the site.

The existing ground contours vary from elevation 14 and 13 near the buildings to a small knoll of elevation 15 at the south east corner of the site. Between the buildings and the fence leading to the southern plain is a shallow saddle which dips below elevation 13 but does not decline to elevation 12 until just before the river bank near the combined sewer outfall. The industrial sites to the north and east of this site are approximately 1 to 2 feet lower in elevation. The south and west border of the site is an embankment subject to the flow of the river and the sewer outfall. The heavy vegetation with young to mature trees and thick underbrush along this embankment is indicative of a relatively stable condition against the constant erosive forces of tide and wave action.

Conclusions:

Based on the existing elevations at the site, the average ground surface of the existing site will be from 2 to 5 feet higher than the 100 year flood level. No significant portion of the site other than the river embankment will be affected by the 100 year flood. During the 500 year flood, some backwater effects would be noticed for the east central portion of the site where existing ground is at or slightly below elevation 12. If water from the 500 year flood would find its way across the lower adjacent properties to the north and east, the higher ground of the Cottman site would effectively block its path from crossing the site and carrying soil into the river. The saddle area where the panhandle expands into the grass plain is the only area where water from the 500 year flood could cross the Cottman site, but if it occurred, the flow would be shallow and with low velocity. Furthermore, because the entire site is proposed to have a minimum cover of 2 feet of new imported fill, the entire site would be effectively protected from the potential of even the 500 year flood flows.

Therefore, we conclude that the site is presently adequately protected from the damaging effects of even the 500 year flood, and will be even further protected by the proposed addition of 2 feet of new fill.

Thank you for this opportunity to evaluate this site. Please advise us if we can be of further service to you in these or other related matters.

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Very truly yours,

Calvin G. Larson, P.E.
Director of Civil Engineering
20500misc\Misc-Proposals\Cottman-prop.0620

LEONARD J. STRANDBERG AND ASSOCIATES,
Consulting Engineers and Land Surveyors, P.C.

cc: *Neil Strandberg, Executive Director*

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ATTACHMENT 2

LEGAL QUALIFICATIONS AND RESERVATION OF RIGHTS

This Statement is attached to and made an integral part of the Comments, Draft Focused Feasibility Study, dated June 26, 2000, prepared by EWK Consultants, Inc. (the "Comments"). The Comments are being submitted to the U.S. Environmental Protection Agency on behalf of U.C.O.-M.B.A. Corporation and the other Defendants (the "Owner Group") in the case of *United States v. The Union Corporation, et al.*, relating to the Metal Bank Cottman Avenue Superfund Site (the "Site"), pending in the U.S. District Court for the Eastern District of Pennsylvania (the "Litigation"), with the purpose, in substantial part, of resolving the Litigation. Neither submission of the Comments to EPA nor any part of its contents are intended to be or are to be deemed as an admission of liability or as a waiver or abandonment of any of the Owner Group's legal rights, positions, claims or defenses otherwise available to them. In that regard it remains the Owner Group's position that its members have been legally relieved of all further liability for response actions or costs at the Site, and that the EPA's Record of Decision for the Site (the "ROD") is seriously flawed and that very limited or no additional remediation is legally or technically necessary or appropriate to achieve the degree of protection of public health, safety or the environment appropriate to the Site. The Comments address proposed implementation of and changes to EPA's chosen remedial alternative adopted in the ROD that will more appropriately and cost-effectively meet the remedial objectives of the ROD. The failure, within the context of these Comments, to object to or challenge any of the deficiencies of the ROD including, but not limited to, the administrative process, the remedial goals and objectives and the selected remedial alternative or any part thereof, is not intended to nor shall it be deemed as acceptance of the ROD or any part thereof. This Plan, prepared on the advise, at the request and under the direction of counsel, and its preparation are Attorney Work Product subject to full protection under the law, the Federal Rules of Evidence, and the Federal Rules of Civil Procedure from disclosure.